THE WALKER TRUST · THE UNIVERSITY OF ST ANDREWS

THE GREAT PALACE OF THE BYZANTINE EMPERORS

SECOND REPORT

EDITED BY DAVID TALBOT RICE

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PREFACE

THE excavations described in this volume were carried out during one preliminary and three main seasons, between 1951 and 1954. Work was then stopped, for it was felt that in view of the number of streets, houses and other modern structures that encumbered the site there was little more that could be accomplished unless a large area of the town were acquired and transformed into an excavations 'park', a task which would require immense financial resources. This does not mean, however, that the site is exhausted; there remains a very great deal to be done, but for work to be truly effective it would have to be conducted on a scale similar to that of the excavations in the Forum at Rome, or those in the Agora at Athens.

The task that confronted us in 1952 was indeed already a limited one, and had four principal objectives, first to unearth such further portions of the mosaic floor that had been found before the war as survived in areas which were not built over; secondly to assure the adequate preservation of the pavement; thirdly to investigate adjoining areas with a view to identifying the buildings concerned; and fourthly, by a careful study of stratigraphical and similar evidence, to establish more firmly than had previously been possible the chronology of the various structures that had existed on the site.

With the exception of a stretch some eighteen metres long on the south-west of the Peristyle, which it is impossible to investigate owing to the presence of modern buildings, the whole area where mosaics might have existed has now been excavated, and the newly discovered sections of the floor are dealt with in Chapter VI of this report. The conservation of the floor has also been completed. Practically the whole of the north-east side of the Peristyle has been roofed over, while mosaics from the north-west and south-west sides have been lifted and installed in the arcades of the Araste Sokak. This is a structure of the early seventeenth century which constitutes a part of the Sultan Ahmed mosque complex, and cuts directly across the site (Fig. 1 and *G.P.*, plan 61). In fact, these mosaics, together with those left *in situ*, now constitute what is virtually a Mosaic Museum, a dependency of the Archaeological Museum at Istanbul.

During the first season, which was really little more than a stocktaking after the war, my wife and I were there alone. During the second season excavations were begun to the south-east of the Peristyle, in the unexplored area between substructures previously examined by Mamboury and listed by him as Db and Dc, though the greater portion of the funds available were devoted to the conservation of the mosaics unearthed before the war. In addition to myself and my wife, the staff consisted of Dr. Spencer Corbett as architect and Mr. Donald Strong as assistant. During the third season, 1953, work of a purely archaeological character was more extensive. The area from which mosaics had been lifted on the south-west side of the Peristyle was excavated; substructures which had been discovered the previous year to the south-east of the Peristyle were further investigated; the fourth or south-east side of the Peristyle was opened up, as was a further section of the north-east side of the court, under the Torun Sokak, and an area previously covered by Turkish structures on the sites A1 and A2 (*G.P.*, plan 61). In addition a subsidiary excavation was also undertaken on the site of the so-called 'House of Justinian', close to the sea. Dr. Spencer Corbett remained on as architect, Mr. David Oates and Miss Wilson joined the staff as archaeologists, and Mr. Michael Scott and Mr. Tudor Pole as assistants. In the latter part of the season Mr. J. B. Ward Perkins, Director of the British School at Rome, took charge of the work, as I had to return to Britain. Work on the 'House of Justinian' was continued by Dr. Spencer Corbett and Mr. Tudor Pole in the autumn, after the main excavation had closed down.

During the final season, 1954, a few further mosaics were lifted from beneath the Torun Sokak, and careful excavations were conducted at a number of points, primarily with the object of checking dates by a strategraphical study. This work was very ably conducted by Mr. David Oates, assisted by Mr. David Stronach and Mr. David Wilson. Dr. Spencer Corbett was replaced by Mr. Geoffrey Clark as architect, though he remained responsible for completing the final plans that are used to illustrate this report; they are all his work except for Figs. 3, 4, 5 and 16, the first two of which were re-drawn by Miss Sheila Gibson from Mr. Oates' sketches and the last two by Mr. Geoffrey Clark. Mr. Ward Perkins also paid a short visit in 1954, primarily to examine the methods of construction to be observed in the great apsed building which had been discovered between Mamboury's Db and Dc, and to study comparative material elsewhere in the city and in Asia Minor.

I would like to take this opportunity of expressing my thanks to all members of the staff for their help in the field, and to those who have worked on the publication, for what they have also done in libraries and studies at home. All have continuously helped one another. The results of that work are incorporated in the pages that follow. Where individual members of the staff have been primarily responsible for particular sections of the dig or the text, however, their initials appear at the beginning of the section or end of the chapter.

In addition to the staff, there are numerous others who helped with the work of our excavations, and I would like to thank them also, both personally and on behalf of the Walker Trust, which I represented. Firstly I would like to mention the British Institute of Archaeology at Ankara, which has throughout been associated with the Walker Trust in sponsoring the work. Its Director in Ankara, Mr. Seton Lloyd, gave frequent help in the laborious process of obtaining permits, and Sir Osborne Manse, its treasurer, organized the transfer of the necessary funds. Dr. Plenderleith of the British Museum gave us valuable advice on methods of treating and conserving the mosaics, while I.C.I. at Istanbul provided what proved to be the most suitable material for the purpose of bringing out and preserving their original brilliant colouring.[1] In Istanbul Mr. W. J. Perkins put his office at our disposal for purposes of correspondence, and afforded us numerous other facilities; Mr. Faruk Akca, of the city architect's department, loaned us a theodolite on two occasions; our friend Cenani Bey not only gave us frequent assistance, but also repeatedly invited us to his delightful house on the Bosphorus on Sundays and holidays. Last, but by no means least, I would mention the Turkish authorities, more especially the staff of the Archaeological Museum at Istanbul. To the late Aziz Ogan, director till the end of 1953, and to Rüstem Duyuran, first sub-director and then director, our debt is outstanding, and without their constant help and support our work would at times have been well-nigh impossible. It was through the Museum that we obtained an excellent foreman and a number of specialized workers, more especially the head of the Restoration Department, Reha Arican, who supervised the lifting of the mosaics and worked with us for many weeks on this exacting task. His zeal and his quiet good humour will never be forgotten by any of us.

The titles of the majority of works to which reference is made are cited in full in the footnotes, except for a few, which are frequently quoted, which are given in abbreviated form. The titles of these are given overleaf.

D. Talbot Rice

Edinburgh, 1958

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[1] The material used was Bedacryl 2 xx, dissolved in Xylene.

ABBREVIATIONS

G.P. *The Great Palace of the Byzantine Emperors*. Being a first report on the excavations carried out in Istanbul on behalf of the Walker Trust (The University of St. Andrews), 1935-1938. Oxford, 1947.

Levi. Doro Levi, *Antioch Mosaic Pavements*, Princeton, 1947.

Mamboury-Wiegand. E. Mamboury and Th. Wiegand, *Die Kaiserpaläste von Konstantinopel, zwischen Hippodrom und Marmara-Meer*, Berlin and Leipzig, 1934.

Vogt. A. Vogt, *Le Livre des Cérémonies*. Tome I and Commentaire I, Paris, 1935; Tome II and Commentaire II, Paris, 1940.

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Pages 144-145 C. Mosaics. Great head at A, A1. See Pl. 50.

INTRODUCTION

IT will only be possible to determine details as to the history of this part of the Great Palace after very much more excavation has been undertaken over a far wider area. It would seem, however, that the original Palace of Constantine did not extend nearly as far towards the south-west as our site, and that the area in which we were working, or in any case a part of it, was occupied by private dwellings; the building excavated below the south-west portico probably belonged to one of these (see p. 16). When exactly the area over which we excavated came to be taken into the Palace enclosure is still a question which it is impossible to answer finally, but it probably already formed part of it by the time that Theodosus II was on the throne, for we know that that Emperor erected a palace known as the Bucoleon, on the seashore, some way to the south-west of our site.[1] It may be assumed that the area between it and the main Palace had already been incorporated, and it is probable that some sort of road or stair connecting this new palace by the sea with the old one on high ground above to the north-east was also made at the same time.

The identity and date of the structures with which we were concerned is a more complicated question, which it is still not possible to answer finally. Certain deductions, which go rather further than those hitherto put forward either in the First Report or by other writers elsewhere can, however, be drawn from the evidence accumulated during our excavations. These will be set out after the evidence itself has been presented and examined. The reader will find them in Chapter VII.

Before describing the excavations, however, a word or two about the site itself is necessary, for without some sort of picture of its nature in the mind, the plans and sections that are given are by no means easy to understand. In general, the ground slopes steeply between the Hippodrome to the north-west and the sea to the south-east of the site. Only at the level of the Hippodrome was a comparatively flat area available, and even there it was not very extensive. In order to provide adequate level ground for building, the slope of the hill was terraced. The terraces took the form either of solid walls, behind which the earth was banked up, or of massive substructures and arcades, on the top of which the essential parts of the buildings were erected. As time went on it appears that these terraces were pushed further and further south-eastwards towards the sea, in order to provide greater space for the Palace buildings at a higher level up the slope. Old substructures were buried or cut down and then re-used to support newer ones on top of them, while further foundations were at the same time erected farther down the slope beyond them. This process was continued from the fourth century, if not before, until the eleventh century, when the Palace began to fall into disuse. It began again in late Byzantine or early Turkish times, and several retaining-walls of Turkish workmanship were built across and above the Byzantine ones at various periods; the most recent is a long high wall which seems to coincide with some sort of original outer terrace between the site of our excavations and the sea; it is shown at the bottom right-hand corner of Fig. 1. The way in which the terraces succeed one another is clearly shown in the longitudinal section of the site (Folders A and B).

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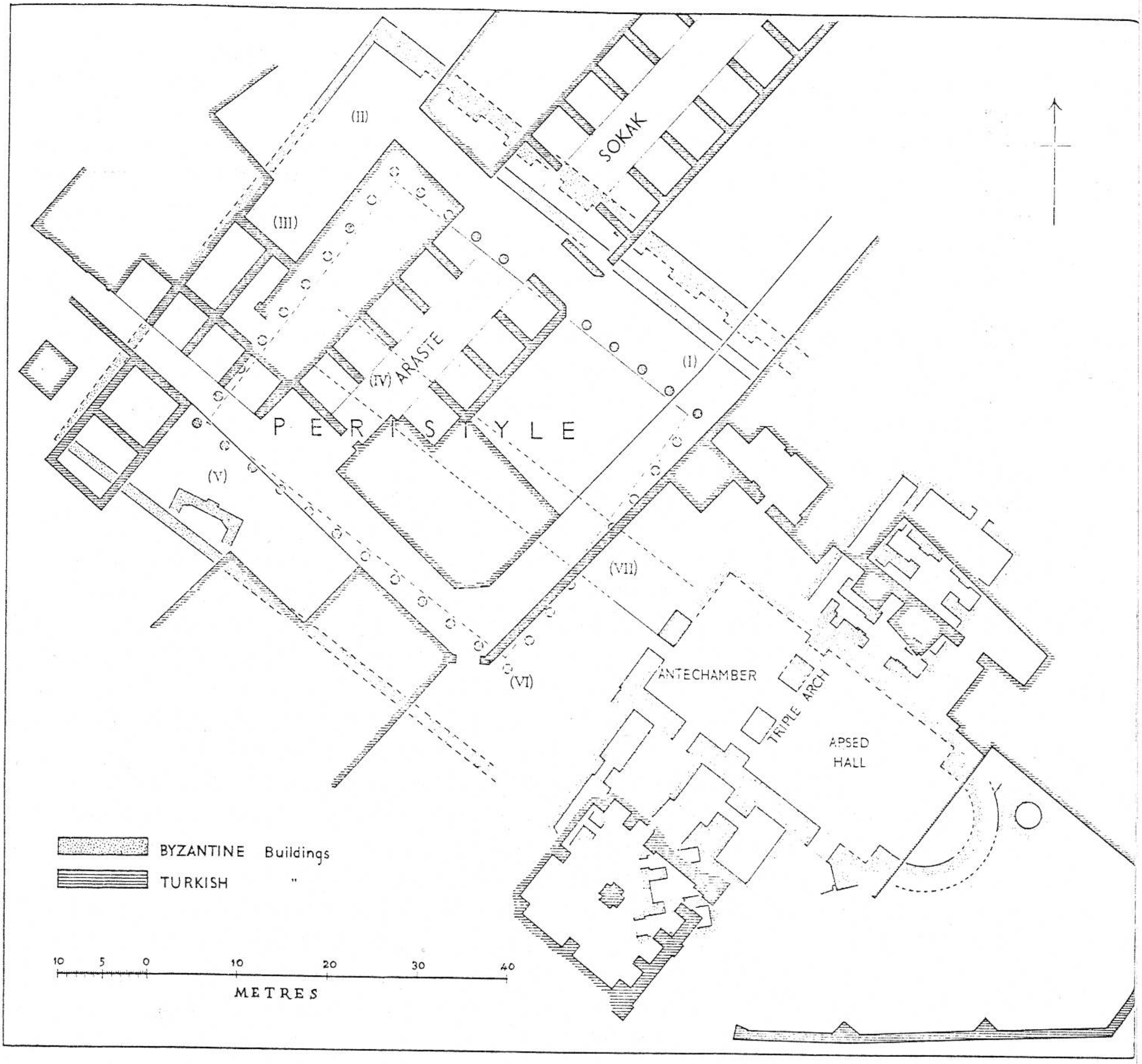
[1] R. Guilland, 'Le Palais du Bukoleon', in *Byzantinoslavica*, X, p. 6, and XI, p. 61.

More impressive, however, and more difficult to cope with in the process of excavation, were a series of vast constructions which served either as bulwarks to sustain the structure of the mosque of Sultan Ahmed, or to house a bazaar and living-quarter which was attached to the mosque. Like the mosque itself, these all belong to the early years of the seventeenth century. The foundation trenches for these walls were cut through filling that had accumulated after the Palace fell into disuse, down to the level of the mosaic or in some cases even through it. The layout of these constructions can be clearly seen on the general plan (Fig. 1); it corresponds in no way with the plan of the Byzantine buildings below, which would appear to have fallen completely into ruin and, indeed, to have disappeared from view long before the Turkish structures were erected. These Turkish structures take the form of arcades, a number of which have now been used to house such mosaics as were lifted in the course of our work because they could not be left *in situ*. The arcades form what is virtually a street, now known as the Araste Sokak.

It would seem on the evidence of the pottery that much of this area of the Palace was used as a rubbish dump as early as the twelfth century, and its ruin must have begun somewhere around 1150. The debris accumulated during the following century, so that the ground-level of the Turkish structures was some two metres above the level of the mosaic. From that time the surface-level remained fairly constant over the main area, but rubbish was still dumped from time to time down the slope on the seaward side, and that process actually continues to this day. The results of the process are twofold. In the first place, the early foundations are in many places well back on the hillside, buried at a tremendous depth below the present surface. In the second, a confusing complex of foundations is often present at a low level, for the later builders did not bother to clear away earlier masonry even when they did not build on the top of it, knowing that it would be obscured at the bottoms of great dark cellars. The number of such foundations that were encountered on our site are described in the pages that follow; their complex nature is clearly indicated on the longitudinal section.

The photographs and plans that are published here indicate the very impressive proportions of these substructures, and if the whole of the Great Palace could be excavated, a magnificent complex of similar substructures would certainly be disclosed. But it must be remembered that the buildings which survive to this day beneath the soil represent no more than the substructures, and that the churches, halls, audience chambers and living-rooms which made up the Palace itself were originally situated above them. Of these main structures on the 'piano nobile' practically nothing remains—nor is it likely to remain in any other part of the Palace that stood on the slopes, except perhaps in so far as the actual floors are concerned. A small portion of such a floor was laid bare by us close to the junction of the Peristyle and the Apsed Hall (Pl. 4, c).

The Book of Ceremonies and the other texts tell us how frequently the Palace was enlarged and reconstructed. Earlier substructures were re-used in this process, and as was clearly the case in the Apsed Hall, all sorts of additions, often of a seemingly inconsequent nature, were made, so that the plan of the substructures did not always correspond very closely with that of the superstructures of the final phase. But it can hardly be doubted that the initial plan of a set of substructures corresponded to that of the original building above, and at some time or another a great Apsed Hall must have constituted the main building on our site at the upper as well as the lower level. What is not certain is that the main building retained this plan in subsequent times. It must not be forgotten that the lapse of time between the fifth century, when some at least of our buildings were set up, and the tenth, when the Book of Ceremonies was written, was very considerable—equal in extent in fact to the span between the Norman conquest of England and the reign of Elizabeth I. Considerable changes in building methods and styles took place during those centuries, and a great deal of rearrangement and rebuilding of the actual Palace was also undertaken. How extensive this was is indicated on the one hand in the texts dealing with the Palace, and on the other by the great complexity of the constructions laid bare by excavation. In the pages that follow an effort is made to disentangle the successive periods so far as one complex of buildings is concerned. But it is also hoped that the comparative survey of building methods that follows will serve to throw light not only on this particular problem but also on the story of early Byzantine architecture as a whole.



(I)
(II)
(III)
(IV) ARASTE
(V)
(VI)
(VII)
SOKAK
PERISTYLE
ANTECHAMBER
TRIPLE ARCH
APSED HALL
BYZANTINE Buildings
TURKISH "
10 5 0 10 20 30 40
METRES

FIG. 1. General plan of the site, showing constructions of all periods.

CHAPTER I

THE EXCAVATIONS OF 1952-54 IN THE PERISTYLE AREA

THE excavations of 1952-54 were undertaken in part in the Peristyle, the scene of the excavations of 1935-38, and in part in the area lying immediately to the south-east of the Peristyle, which had been the subject of previous enquiry only so far as was possible without extensive excavation or systematic study. As will be seen from the following account, the two areas were intimately related in antiquity, the Peristyle in its original form serving as a monumental forecourt to a rectangular apsed building, the Apsed Hall, which projected south-eastwards from the middle of the south-east portico. In both areas there had been earlier buildings, and all these underwent subsequent modification; but in describing these earlier and later developments it will be convenient to follow the pattern imposed by the excavations themselves, and to consider them in relation to the definitive layout of the site, as represented by the Peristyle and the Apsed Hall, though in a concluding section the relationship between the various structures so disclosed will be discussed.

For a proper understanding of the remains excavated it is essential to bear in mind that, before the construction of the first buildings of which we have any trace, the natural ground-level sloped uniformly and quite steeply southwards, on a line running obliquely across the whole site. The present upper terrace is an entirely artificial creation, the result of many centuries of accumulated growth. The Peristyle and Apsed Hall represent one stage only, albeit an important one, in that growth, incorporating and preserving within their substructures the remains of earlier buildings, and themselves incorporated in and preserved by later terracing operations. This fact at once explains the survival of the substructures, except where quarried away by later builders in search of materials; and it explains the almost complete disappearance of any ancient structures above floor-level. For purposes of reference the mean level of the mosaic pavement within the Peristyle affords a convenient datum-line, and unless otherwise stated all heights and depths are given from this line.

Another consideration that has to be borne in mind in reading the following account is that the site is now occupied by several modern roads and buildings, and by the very substantial remains of the Turkish quarter adjoining the Sultan Ahmet mosque, now known as the Araste Sokak; moreover, the Turkish builders in particular appear to have ransacked the whole area for materials, with the result that a great deal of the subsoil is very unstable. These factors, coupled with the great depth of some of the earlier structures, mean that in a great many places where excavation is theoretically desirable it is a practical impossibility; and that, even where the ground is available, it is by no means always possible to dig right down to the earliest levels. These difficulties will explain, if they do not excuse, some of the shortcomings of the following account, and they constitute an essential factor in any assessment of the results achieved.

* * * * *

Our object in reopening the excavations of the Peristyle was twofold: to preserve the known mosaics and trace their continuation in certain hitherto unexplored areas, and to re-examine the earlier and later levels in order to check certain discrepancies in the previously published account, with the object of establishing, if possible, a more accurate chronology. The mosaics are described in Chapter VI of this report; the present section deals with the structural history of the buildings. Direct evidence as to date was not forthcoming, but we were able to deduce a relative sequence which amplifies, and in some important respects amends, the conclusions of the previous excavators.

The areas examined, in the order of their description, are:

(1) *The south-east end of the north-east portico.* This lay under the roadway of the Torun Sokak and had not previously been accessible. Besides exposing a new and relatively undamaged stretch of the mosaic, we were able to cut here a fresh section through the post-mosaic levels (Fig. 2, I).

(2) *The north-east end of the north-west portico* (Site A4 of the earlier excavations, *G.P.*, pp. 9 and 13). Here we extended and deepened the existing excavation within the portico, to examine the foundations of the outer wall of the Peristyle in relation to early ground-levels and to the post-mosaic rebuilding (Fig. 2, II).

(3) *The north-west portico and the Paved Way* (Site A6, *G.P.*, p. 6), where we lifted surviving stretches of the mosaic overlying the Paved Way and confirmed previous observations of the relationship between the Paved Way and the Peristyle (Fig. 2, III).

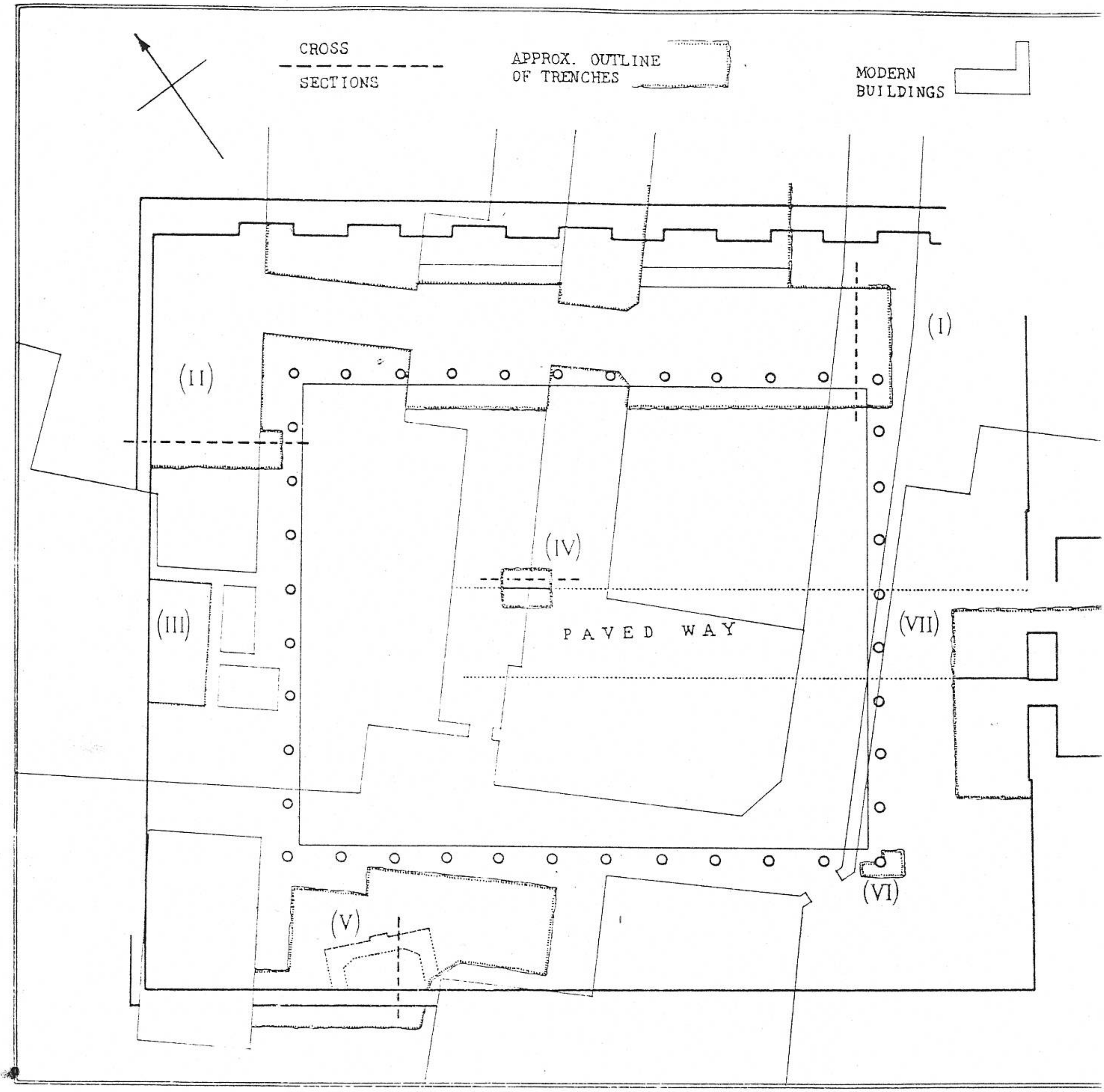

CROSS
SECTIONS
APPROX. OUTLINE
OF TRENCHES
MODERN
BUILDINGS
(I)
(II)
(III)
(IV)
PAVED WAY
(V)
(VI)
(VII)

FIG. 2. Plan of Peristyle area, showing areas investigated between 1952 and 1954.

(4) *The courtyard of the Peristyle*, where a short stretch of the masonry of the Paved Way was exposed to a greater depth than previously between the arcades of the Araste Sokak (Fig. 2, IV).

(5) *Excavations below the south-west portico* (Site F, *G.P.*, p. 6). The removal of mosaics at this point revealed earlier structures cut through by the south-west outer wall of the Peristyle (Fig. 2, V).

(6) *The south angle of the Peristyle stylobate*, locating the actual angle (Fig. 2, VI).

(7) *The middle of the south-east portico*, within the Aygir Deposu, the Government stud farm. This led to the discovery of the Apsed Hall beyond, which forms the subject of our second section (Fig. 2, VII).

(1) THE SOUTH-EAST END OF THE NORTH-EAST PORTICO (Fig. 3; Pl. 1, A, C). Cleared in 1952-54 by D. T. R. in order to recover the remaining stretches of mosaic. Section observed and recorded by J. B. W. P. and D. O.

The mosaic at this point was found to be well preserved over its whole width, except for the outer register and border, which had been obliterated in antiquity by the insertion of the later wall described in the First Report. After being repaired with patches of pink cement, the mosaic had been covered by a pavement consisting of slabs of Proconnesian marble 35-40 mm. thick and bedded on a 20-cm. layer of hard pinkish-white cement, in which were incorporated at irregular intervals single complete or more often broken bricks (Fig. 3, 1). This pavement can be clearly seen at the back of Pl. 1, A. The uneven profile of both the marble pavement and the mosaic floor is due to the subsidence of the made-up soil beneath the portico. After the abandonment of the building, debris accumulated over the marble pavement to a maximum height of about 1 m. (Fig. 3, 2). The wall at the north-east end of the section, thought by the previous excavators to be contemporary with the marble floor, is in fact undoubtedly later. Its foundation trench is clearly visible, cutting down through debris, marble pavement and mosaic floor alike (Fig. 3, 3), and fragments of both marble pavement and mosaic were recovered from its filling. At the south-west end of the section, all that can now be seen is a trench, cutting down through the debris from a level about 1 m. above the marble pavement, the work of later builders in search of materials (Fig. 3, 4). At this point they have removed all trace of any masonry standing above pavement level; but about 2 m. to the east of the observed section the foundations of the inner colonnade of the portico are still preserved, and consist of a 'greenstone' block (the footing of what is presumably the penultimate column-base of the north-east

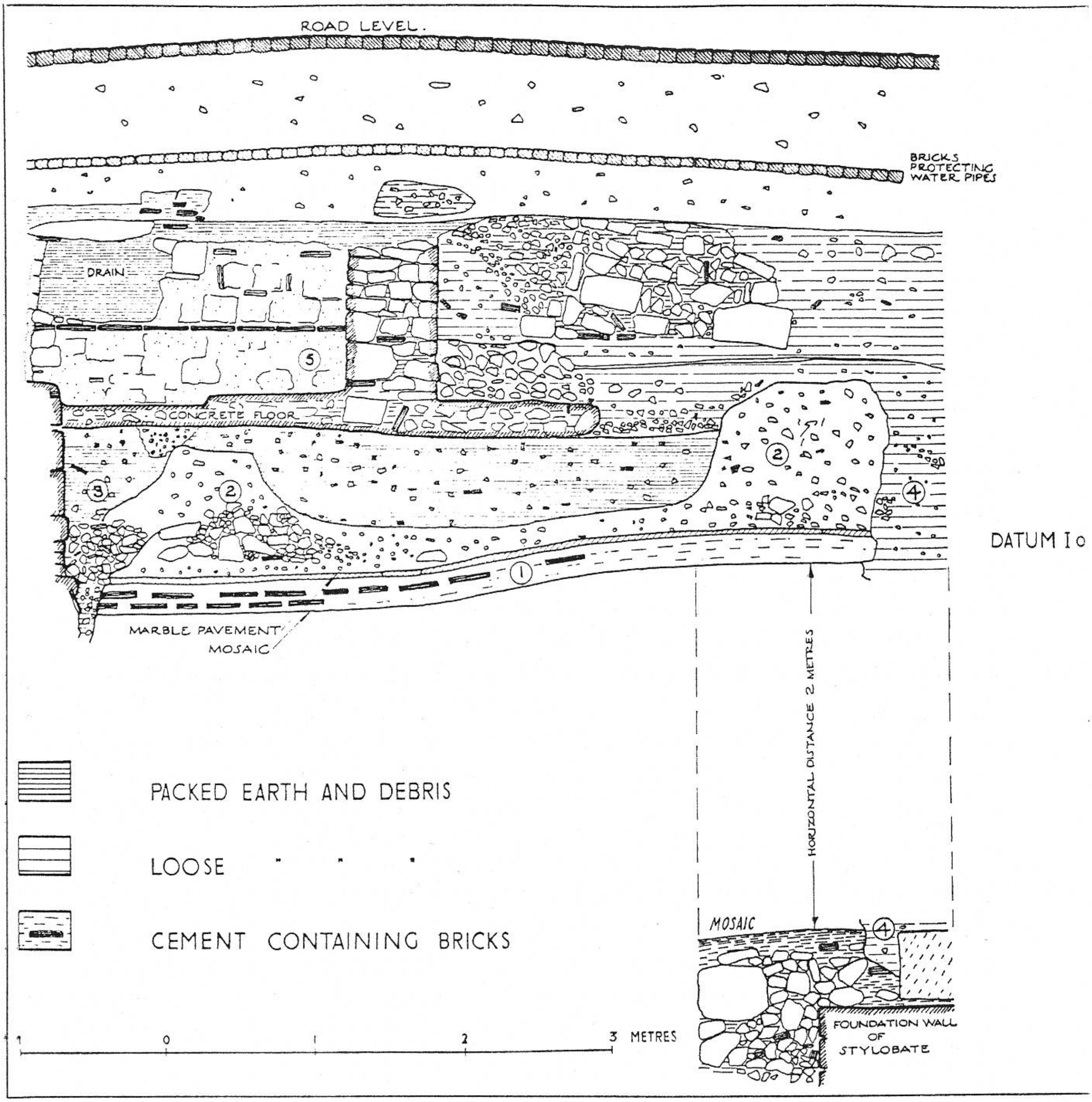

ROAD LEVEL.
BRICKS PROTECTING WATER PIPES
DRAIN
⑤
CONCRETE FLOOR
③
②
②
④
①
DATUM 10
MARBLE PAVEMENT
MOSAIC
HORIZONTAL DISTANCE 2 METRES
PACKED EARTH AND DEBRIS
LOOSE
CEMENT CONTAINING BRICKS
MOSAIC
④
FOUNDATION WALL OF STYLOBATE
1
0
1
2
3 METRES

FIG. 3. Section below Torun Sokak (see Pl. 1, A and C, and Fig. 2, I).

portico) set on a continuous stylobate of smaller masonry. The debris overlying the middle of the pavement had also been trenched, presumably in search of useful building material, and the whole is now overlaid by the foundations of a later, Turkish building (Fig. 3, 5). The destruction of this and the considerable levelling up to the paving of the present roadway may be attributed to the builders of the Sultan Ahmet mosque quarter in the early seventeenth century.

Several important new facts emerged from the excavation of this area. In the first place it is now clear that the reduction in the width of the north-east portico, previously thought to be contemporary with the marble pavement, is an altogether later event. There is no reason to doubt that the original outer wall of the portico continued to serve as such throughout the marble-pavement phase. As regards the wall suppressing the inner colonnade and converting the portico into a closed corridor (*G.P.*, p. 9), the evidence of the section is, on the other hand, inconclusive. There does not seem to be any reason to question the previous excavator's conclusion that it is contemporary with the marble pavement rather than with the subsequent narrowing of the portico corridor.

Another new fact that emerged is that the portico continued on this side at least as far as the point suggested, without positive evidence, on the previously published plan. It was impossible to determine whether the mosaic turned along the south-east side of the court, since it had been destroyed by the foundations of buildings on the far side of the Torun Sokak, and no trace of it was found thereafter. But the last stylobate block to be recovered was considerably longer than the observed standard size and probably supported the base of the angle column; its position accords with the line of the south-east stylobate as observed elsewhere (p. 20). The danger of undermining existing buildings prevented us from investigating further this corner of the Peristyle and from making more detailed observations as to the date and purpose of the trench-built stone arch which continues the line of the north-east stylobate beneath the level of the mosaic (*G.P.*, p. 7); but we were able to throw new light on the relative date and function of the corresponding arch beneath the north corner of the Peristyle in the course of the excavations described in the next section, and there is every reason to suppose that the two are to be assigned to the same date.

No new evidence was forthcoming at this point as to the date of the earlier structures. But from the excellent state of the marble pavement and mosaic below the Torun Sokak it is clear that the greater part of the damage to the adjoining sections of mosaic took place after the building of the new quarter in the early seventeenth century. By that time this part of the Palace had long been in ruins; but there is no trace before then of any systematic reoccupation of the site.

(2) THE NORTH-EAST END OF THE NORTH-WEST PORTICO (Fig. 4; Pl. 2). Site A4 of the previous excavation (*G.P.*, pp. 9 and 13). Cleared and re-examined in 1953-54 by J. B. W. P. and D. O.

This trench was bounded on the north-west by the footing of the outer wall of the Peristyle, and on the north-east by the subterranean arch joining this wall to the north corner of the portico stylobate. The earlier excavation was extended and deepened to give a new section across the line of the north-west portico, parallel to and at a distance of 5 m. from the arch. This involved tunnelling under Turkish masonry to reach the line of the stylobate, and at this point it was not possible to carry the trench to the same depth as elsewhere. Over the rest of the section the earth immediately underlying the level of the mosaic had already been removed by the previous excavators.

The section (Fig. 4) revealed an interesting sequence. From natural bedrock up to an average depth of 2·2 m. below datum, the fill consisted of tips of soil which contained quantities of oyster-shells and other rubbish, together with fragments of mortar and potsherds of all periods, from the early fourth century B.C. to the fourth century A.D., obviously the spoil from clearance operations elsewhere which had been tipped down the slope from the north (Fig. 4, 1).

This accumulation was approximately levelled, before the start of new building operations, by a 50-cm. layer of comparatively barren packed earth (Fig. 4, 2), and a trench was then dug to receive the footing of the north-west outer wall of the Peristyle (Fig. 4, 3); its sides were retained with timber shuttering, supported by vertical timbers and braced by transverse baulks, the impressions of which are still clearly visible in the mortared rubble of the foundation itself (Pl. 2, A, B). The lower part of the stylobate could not be examined, but the upper part, some 2·5 m. clear of the edge of the original slope, was built free-standing. The layer of beaten earth, sand and builders' debris which covers the original deposits (Fig. 4, 4) represents the phase of building activity, and is overlaid on the south-west side by barren earth deposited during the final operation of levelling to receive the mosaic floor (Fig. 4, 5). A compact pocket of shale let into the ground midway between the stylobate and the outer wall may have served as a firm base for a scaffold-pole or derrick during the erection of the colonnade.

When, at a later date, the north-east portico of the Peristyle was turned into a

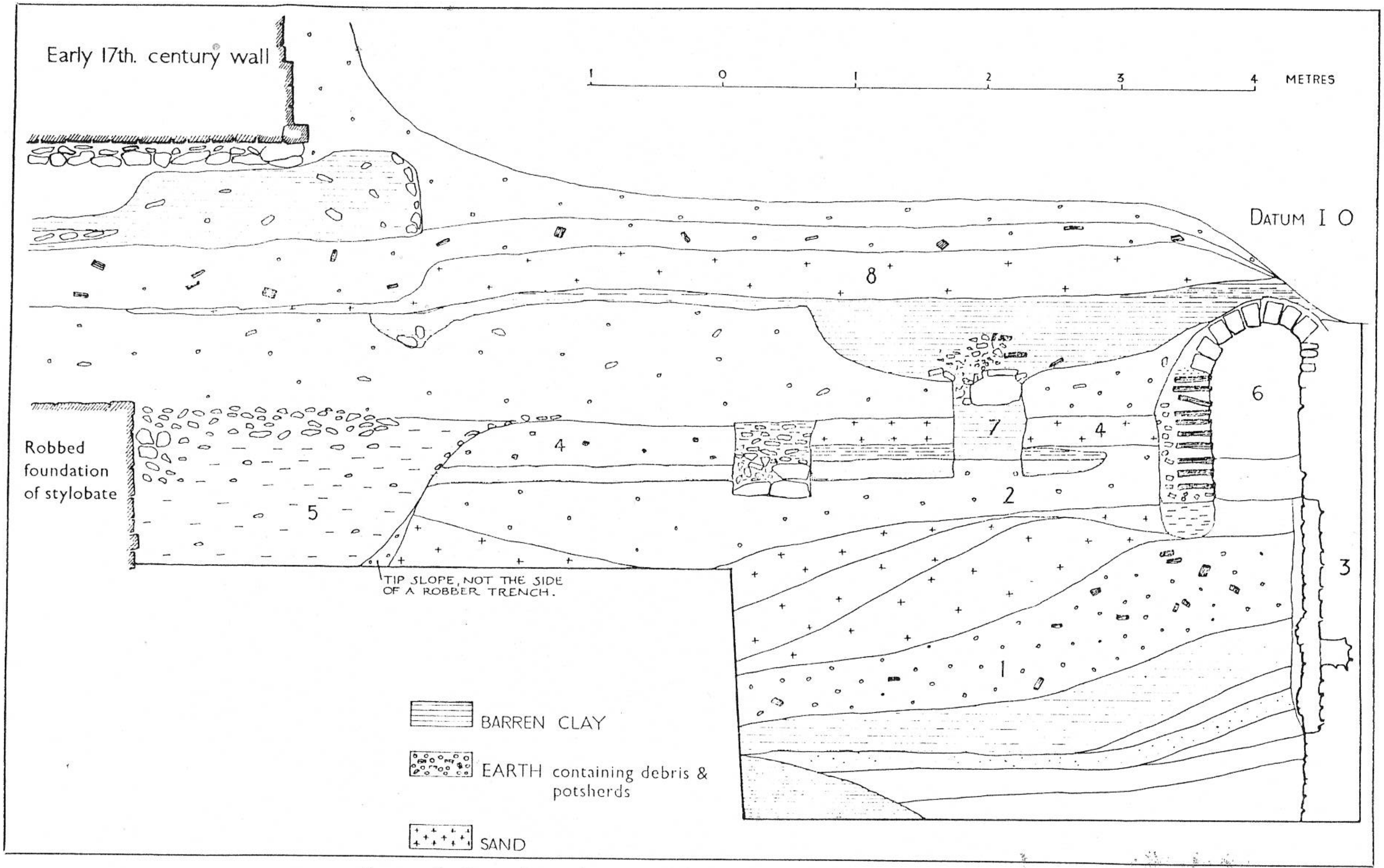

Early 17th. century wall
1
0
1
2
3
4
METRES
DATUM I O
8
6
7
4
4
2
3
1
5
Robbed foundation of stylobate
TIP SLOPE, NOT THE SIDE OF A ROBBER TRENCH.
BARREN CLAY
EARTH containing debris & potsherds
SAND

FIG. 4. Section at the north corner of the Peristyle (see Pl. 2, c and Fig. 2, II).

closed corridor, the north-west portico, with which we are dealing, was suppressed. The mosaic and its foundations were removed, and the stylobate footing robbed of its stone, down to the original building level; and the built footings of the outer wall were dismantled and re-erected so as to incorporate a drain, not visible in the section, which passed through the thickness of the wall from the north-west (Pl. 2, D) and fed into a conduit, built of brick with a pitched-brick vault,[1] running the length of the portico against the outer wall (Pl. 2, C; Fig. 4, 6). The south-east side of the conduit was trenched into the building-levels of the earlier phase down to the top of the original spoil tip, and the side of the trench lined with mortar and fragments of brick against which the coursed bricks were laid.

Throughout the length of what had been the north-east portico, the builders of the corridor were able to make use of the existing stylobate; but at the two ends their wall had to cross the mosaic to meet the north-west and south-east outer walls, and here the risk of subsidence in the made ground below presented a serious problem. To overcome this difficulty, a trench was dug down from the building-level mentioned in the previous paragraph, and in it a stone arch was inserted between the north corner of the stylobate and the outer north-west wall, the face of which was cut away to provide a seating for the lower voussoirs (Pl. 2, E). The other end of the arch was probably grouted in similar fashion into the corner of the stylobate footing, but we were prevented from examining this point by the overlying Turkish buildings. Having thus provided a secure foundation for the corridor wall, the trench was filled in and the whole area levelled with packed earth.

At some subsequent date a new, smaller drain was inserted on a line parallel to, and 2 m. south-east of, the vaulted conduit; its masonry had collapsed at this point, but the trench dug to receive it and subsequently filled with rubbish is clearly distinguishable from the packed earth on either side (Pl. 2, B; Fig. 4, 7). Among the rubbish were some sherds of the green and orange glazed ware identified by the previous excavators, on typological grounds, as early Isaurian (*G.P.*, pp. 34-5). Unfortunately they failed to distinguish the intrusive trench, and it is consequently impossible to say for certain whether the two seventh-century coins found at this level were associated with the packed earth of the corridor period, or came from the later drain. All our sherds in this category came either from the drain itself or from its trench; the earth on either side produced only a few unglazed or burnished sherds of indeterminate date. After the laying of the second drain the whole area was covered with a thick layer of sand (Fig. 4, 8), perhaps a sign of more building activity near by;

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[1] Bricks, average 32 cm. square by 4 cm.; 5 courses to 47 cm.

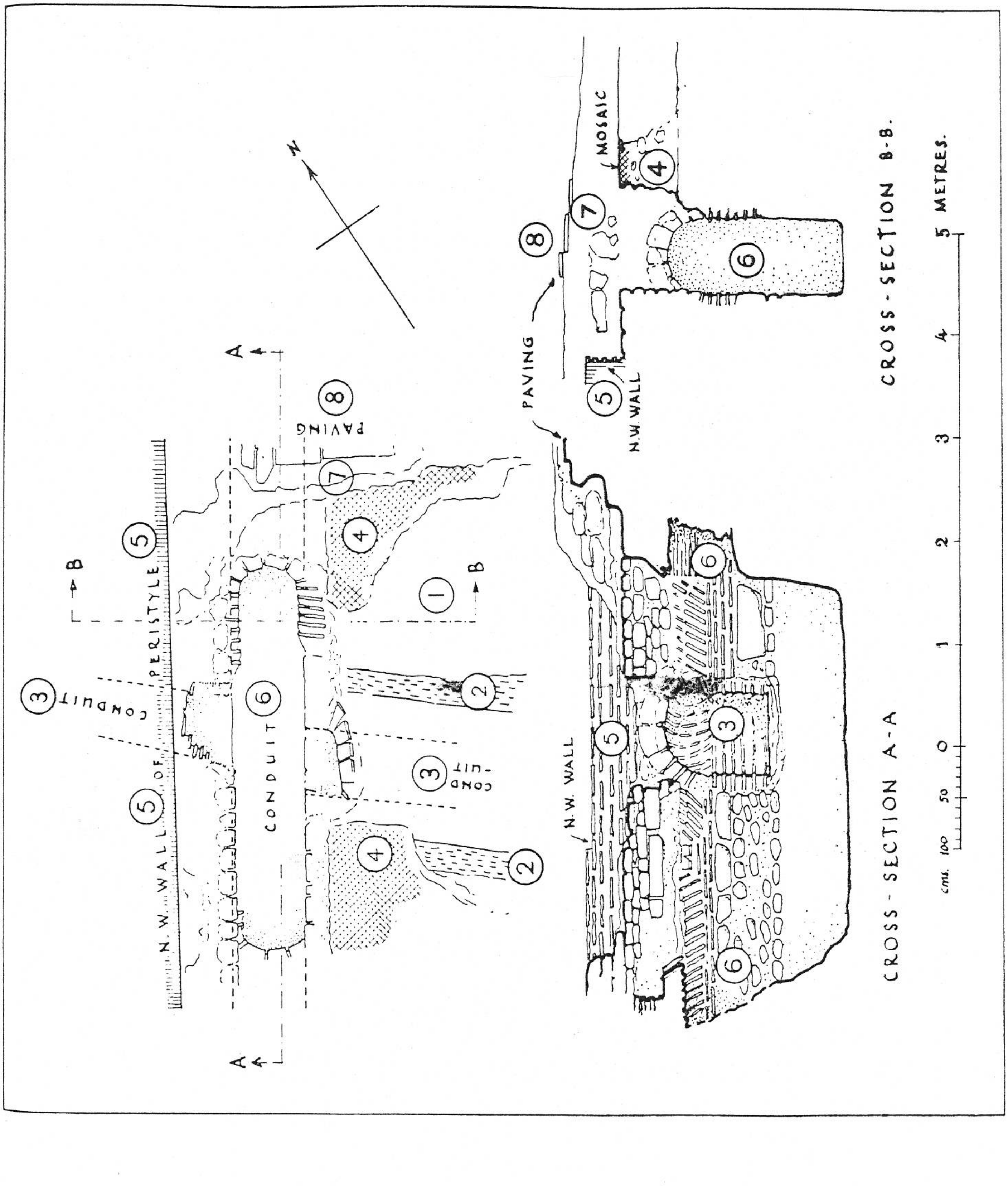
this is topped by humus, and both levels continue under the foundations of the buildings backing on to the early seventeenth-century Araste Sokak. The levels associated with these latest buildings were removed at the start of the original excavation.

(3) THE NORTH-WEST PORTICO AND THE PAVED WAY (Fig. 5; Pl. 1, B). Site A6 of the previous excavation (*G.P.*, p. 9). Re-examined by D. O. in 1954.

In the middle of the north-west portico, where the mosaic pavement overlay the end of the Paved Way, our investigations were confined to reopening the earlier trench in order to verify the relation between the Paved Way, the mosaic of the portico, and the marble pavement, which are found together only at this point. The site is a restricted one, being enclosed on all four sides by the walls of one of the row of seventeenth-century chambers parallel with the Araste Sokak. Consequently we were unable to extend the excavation to obtain an undisturbed section, and could only examine the fragmentary remains of the features exposed by the previous excavators, who had, inevitably, removed the associated debris.

The earliest feature of this complex (cf. *G.P.*, pl. 4, 2 and plan 63) was the hard cement surface of the Paved Way (Fig. 5, 1), on which its marble paving-slabs had rested. A trench (Fig. 5, 2) had been cut in this surface to receive a conduit, vaulted with pitched bricks (Pl. 1, B), which entered the Peristyle obliquely through the footing of the north-west wall and turned south-eastwards along the axis of the Way as far as the stylobate, which it then followed to the south-west (Fig. 5, 3). The fill of the trench consisted of soft, dark earth, which distinguished it clearly from the hard cement. The foundation for the mosaic (Fig. 5, 4) rested directly on the vault of this conduit, and above mosaic-level it was also overlaid by five courses of the original north-west wall (Fig. 5, 5); it is obviously part of the drainage system associated with the first period of the Peristyle.

In the second period, when this portico was abolished, we have already seen that a second conduit was built along the footing of the north-west wall (Fig. 5, 6). The trench in which it was laid cut through and obliterated the outer borders of the mosaic and crossed the line of the earlier drain, which must now have discharged into it; it too was sunk deep into the surface of the Paved Way. This conduit, too, was vaulted with pitched bricks over much of its length. An abrupt change, at the north-east end of the exposed tract, to a barrel vault with bricks laid radially, may mark the position of some superficial feature, since destroyed; or it may be not more than one of the radially laid arches with which such vaulting was regularly strengthened (cf. Pl. 20, E). After the drain had been laid, the trench was packed with


N.W. WALL OF PERISTYLE
5
5
3
CONDUIT
6
CONDUIT
3
COND-UIT
4
2
1
4
2
7
8
PAVING
A
A
B
B
N
CROSS-SECTION A-A
N.W. WALL
5
6
3
6
CROSS-SECTION B-B
8
PAVING
7
MOSAIC
4
6
5
N.W. WALL
cms. 100 50 0 1 2 3 4 5 METRES.

rubble set in white mortar (Fig. 5, 7), and this continued over the mosaic and the footing of the north-west wall to support shallow steps leading down from the newly raised corridor on the other side of the wall (*G.P.*, p. 13) to the level of the courtyard covering the site of the Peristyle. The level of the topmost step is approximately 70 cm. above the mosaic (Fig. 5, 8), whereas the level of the courtyard stood probably at that of the pavement in the north-east corridor, about 25 cm. above the mosaic. Fragments of the marble treads of these steps, each 10 cm. high, can be seen beneath the Turkish wall that bounds the excavation on the north-east (Fig. 5; Pl. 1, B). They imply the existence of a doorway into the corridor at this point, but since no trace of the contemporary corridor wall exists above the level of the steps, its exact position cannot be determined. Assuming it to have been on the axis of the court, which lies about 1·5 m. from the surviving part of the steps, it must have been at least 3 m. wide.

This area, although it poses several minor problems to which we have no answer, presents an outline of the building sequence within the Peristyle which accords fully with the evidence afforded by the two sites already described. The first major feature on the site was the marble-surfaced Paved Way, running from north-west to south-east on a line a little to one side of, and slightly diverging from, the axis of the later courtyard. Its structural relation to the outer wall of the courtyard is obscured by the building of the second conduit, but it is clear both from the superimposition of the mosaic and from the insertion into its surface of the first conduit (itself associated with the setting of the portico mosaic) that as an exposed feature it went out of use at this point when the portico was laid out; and since part of the brickwork of the north-west wall survives above mosaic-level at precisely this point, there can have been no axial communication into the portico during the Peristyle period. Such access was, on the other hand, established later, when the north-east portico became a separate corridor, and the door with its flight of steps led directly into the open courtyard from the north-west; it remains a possibility, therefore, that throughout the intervening period the central part of the Paved Way had continued to serve as a pathway leading across the open space contained within the Peristyle.

(4) THE COURTYARD OF THE PERISTYLE AND THE STRUCTURE OF THE PAVED WAY (Fig. 6; Pl. 3, A). Site O of the previous excavations (*G.P.*, p. 7, and Pl. 2, Fig. 3). Re-examined in 1954 by D. O.

Having established that the earliest feature on the site was the Paved Way, it was necessary to examine its structure in order to obtain some idea of its function.

This was only possible in one place, between the arcades of the Araste Sokak in the open central area of the Peristyle, and here we again deepened an earlier trench; the attempt to reach the foundations of the structure had to be abandoned as too dangerous, but we were able to recover a partial elevation of its north-east side down to a depth of 4·2 m. below its original surface.

The Paved Way consists of a series of vaulted chambers forming a viaduct from north-west to south-east, slightly off the long axis of the later Peristyle. The sides of the viaduct were carried on a lower range of brick arches, of which the one we exposed was high-pitched, irregular in shape and of very rough construction.[1] We were unable to inspect the footings of the piers from which this arch sprang, but the wall between it and the next arch to the south-east was faced with small, very roughly dressed and coursed blocks of limestone set in white mortar. On this had apparently been founded, level with the top of the arch, one or more courses of brickwork.[2] From this point the surviving wall is set back from the line of the lowest arch, leaving a ledge 50 cm. wide along the side of the viaduct, 2 m. below its surface. At the back of this ledge stands a second arcade of very low-pitched, and equally rough, brick arches,[3] blocked with bricks set radially but in a haphazard manner. The lower arch was found open, but fragments of mortar adhering to its soffit suggest that it too was originally blocked. The upper arcade carries coursed brickwork[4] supporting the side of the roadway above, where we found the same hard-packed cement foundation for marble paving as we had already observed elsewhere. The fill of the chamber behind this wall consisted of dark earth containing fragments of mortar and stone, but no datable material. The soil outside showed signs of disturbance to the full depth of the excavation, and this, with the damage to the brickwork itself, suggests that the site has been dug over in search of building material, and that anything worth the effort of removal has been taken away; in particular, it seems possible that the upper arcading may have been originally masked by a more regular face, founded on the ledge above the lower arches and perhaps carried up to form a parapet for the pavement itself. At the only point where we have seen the other face of the structure (see below, p. 21), its upper parts at least were rather more carefully built; but on the north-east side, at any rate, the surviving brick and stone work was certainly not intended to be visible. This implies that the surrounding ground, when the Paved Way was in use, was at

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[1] Bricks variable, 30-34 cm. square by 4 cm. Height of arch, 1·44 m.; width at spring, 2·04 m.

[2] Bricks, average 34 cm. square by 4 cm. Part of one course alone survives.

[3] Bricks, 38 cm. square by 4·5 cm. Height of arch, approx. 85 cm.; width, 3·00 m.

[4] Bricks, 38 cm. square by 4·5 cm.; 5 courses to 50 cm.

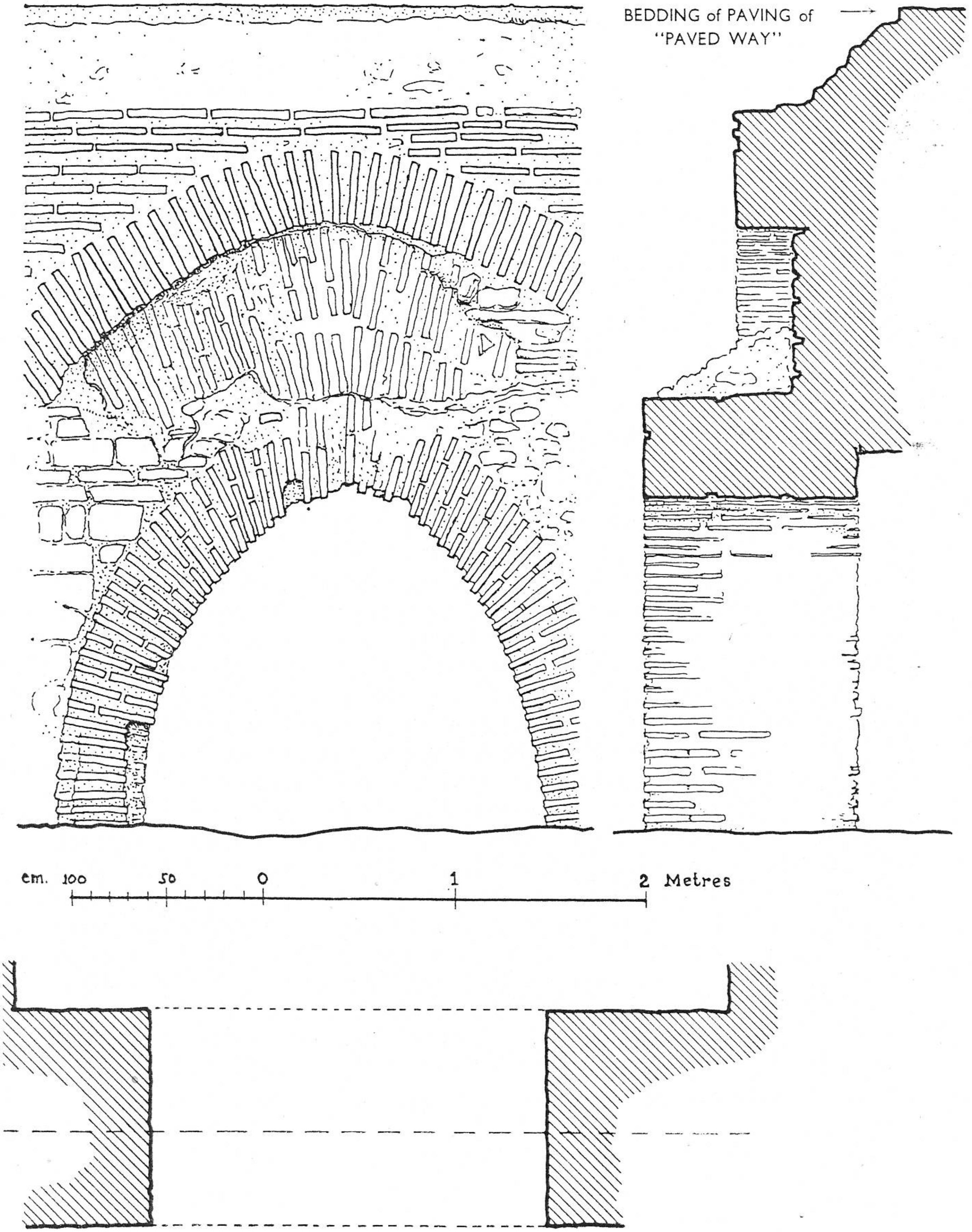
BEDDING of PAVING of "PAVED WAY"
cm. 100
50
0
1
2 Metres

FIG. 6. Elevation and section of the Paved Way.

least as high as the top of the lower arches, and possibly at the level of the pavement; in short, that at this point the nucleus of the upper terrace of the Great Palace goes back at least to the time of the construction of the Paved Way, and that the function of the latter was to provide access to some building on the outer edge of the terrace.

(5) EXCAVATIONS BELOW THE SOUTH-WEST PORTICO (Fig. 7; Pl. 3, C, D). Site F of the previous excavations (*G.P.*, Plan 61). Because of their battered condition the surviving mosaics on this site were lifted in 1954, and the substructures examined by D. T. R.

The lifting of the mosaics made available for excavation an area some five metres wide by fifteen long, lying between the outer south-west wall of the Peristyle and the stylobate of the colonnade, near the west corner of the latter. At this point the outer wall was found to have been built of roughly coursed small stonework up to mosaic-level (Pl. 3, C, on the left); there was then a course of 'greenstone' blocks, and above this there were bricks. The area within the portico was riddled with trenches, wells and other intrusive holes of various dates; but it was possible to determine that here, as in the other porticoes, the ground had been made up by dumping earth from elsewhere, and in this filling, its floor about 1·5 m. below the level of the mosaic, was found the remains of a building that had stood on the site before the construction of the Peristyle (Fig. 7).

This earlier structure, the walls of which had been cut down to a height of about 70 cm. and its floor and walls cut through by the foundation trench of the outer retaining-wall of the Peristyle, was built of hard, well-fired bricks, each measuring 34×34×5 cm. About half of them bore stamps, either in the form of a monogram or a single-line inscription, both being variants of the name ΓΑΙΟΣ (see p. 106, nos. 1-3). The mortar was pale pink and of fine quality, the thickness of each course being slightly greater than that of the bricks. On the inside of the building the walls were covered with a coat of hard plaster, pink in colour. The floor was covered with a similar plaster and was laid on a brick vault. Three rough capitals of marble, looking like unfinished impost capitals, were found on the floor (Pl. 4, E); they were not *in situ*, but would appear to have belonged to the building and to have fallen to the floor when it was pulled down, together with mortar and smaller debris. It is by no means easy to assign an exact date to these capitals. Examples published by Kautsch with a similar broad abacus, low truncated pyramidal body, and corners obliquely cut and circular necking come from Corinth, Stobi and Alexandretta;

the earliest of them he dates to around 500.[1] One would perhaps expect to find that provincial examples date from rather later than those from the metropolis. On the other hand Professor Krautheimer, after examining photographs of the Constantinople examples, compares Kautsch's no. 677 A and B, and suggests a date as late as about 600.[2]

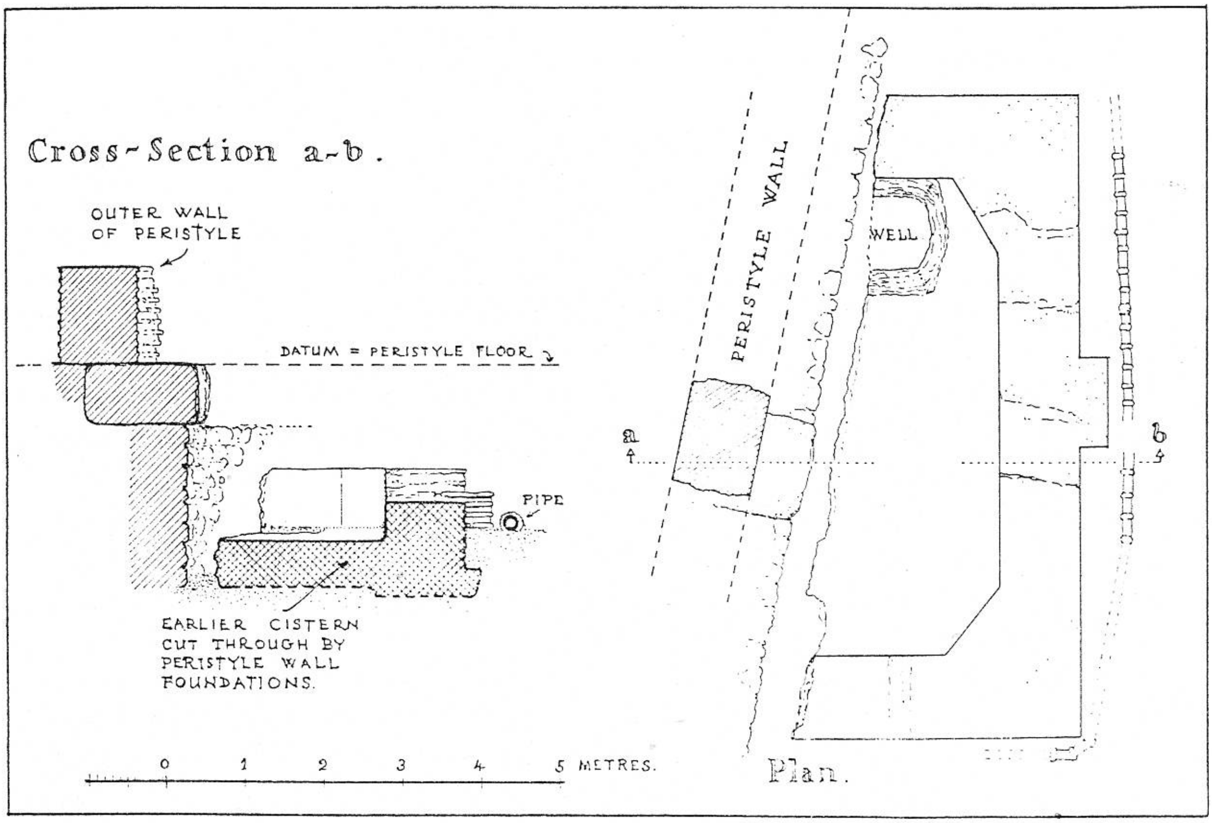
Cross-Section a-b.
OUTER WALL OF PERISTYLE
DATUM = PERISTYLE FLOOR
PIPE
EARLIER CISTERN CUT THROUGH BY PERISTYLE WALL FOUNDATIONS.
0 1 2 3 4 5 METRES.
PERISTYLE WALL
WELL
a
b
Plan.

FIG. 7. Plan and section of outer Peristyle wall and the earlier building below the south-west portico (see Fig. 2., V).

Owing to the proximity of later structures and streets, it was possible to examine the foundations of this building in one place only. In the foundation trench for its outer wall, and on the outer side (Pl. 3, D, at the far end), a fragment of a pottery lamp and the base of a glass ring-bowl were found. The lamp is of a type usual in late Roman and early Christian times, and bears a cross in relief as part of its decoration (Fig. 8). The glass fragment is of a type which was common at Karanis in the early fourth century.[1] The evidence afforded by the capitals has been summarised above. It cannot be asserted that they belonged to the building, but they must certainly be earlier than the mosaic. The conclusions that can be drawn are thus of a very striking character. On the one hand, the building can hardly be earlier than about 350, and this precludes absolutely the fourth-century date for the Peristyle suggested by certain critics (see p. 152 ff.). On the other, the capitals could be as late as the end of the sixth century and are in any event not likely to be much earlier than the end of the fifth. The evidence of the brick stamps also supports a date late in the fifth or even in the sixth century.

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[1] See Kautsch, *Kapitellstudien*, nos. 244, 500 and 666. His no. 245, in the Constantinople Museum, is also similar.

[2] We should like to thank Professor Krautheimer for examining the material and generously giving his opinion.

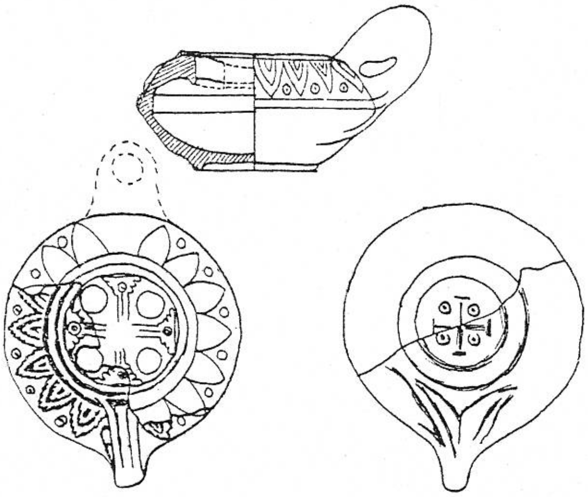

FIG. 8. Pottery lamp from early building below south-west portico.

The conclusions to be drawn from this evidence as to the dating of the Peristyle and its mosaic are of outstanding importance and will be discussed in detail at a later stage (see p. 163 ff.).

The presence of cement on the walls and floor of this earlier building suggests that it was a bath or cistern. It is known that a number of private houses and palaces stood in this area in early times (see Appendix, p. 197), and it is very probable that this earlier building may have been a part of one of them.

Outside the walls of this building, and at a level of about 30 cm. above its floor, was a water conduit, of simple pottery pipes (Pl. 3, D). This conduit was already in position when the earth filling for the mosaic floor was deposited; but was also later than the early building, since it was at a higher level than its floor, and its pipes turned the corner of the building in a way obviously premeditated. It would seem, therefore, to have been an integral part of the Peristyle structure, intended, probably, to carry off the water from the roof. Pipes of this type are not uncommon at Constantinople. Each one has a projection at one end to fit into a corresponding

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[1] Donald B. Harden, *Roman Glass from Karanis* (University of Michigan Studies, Humanistic Series, xli, 1936), pls. XI, XII, XIV, Nos. 15, 17, etc., and p. 18. We take this opportunity of thanking Mr. Harden for his help in dating and studying the few glass fragments that were found.

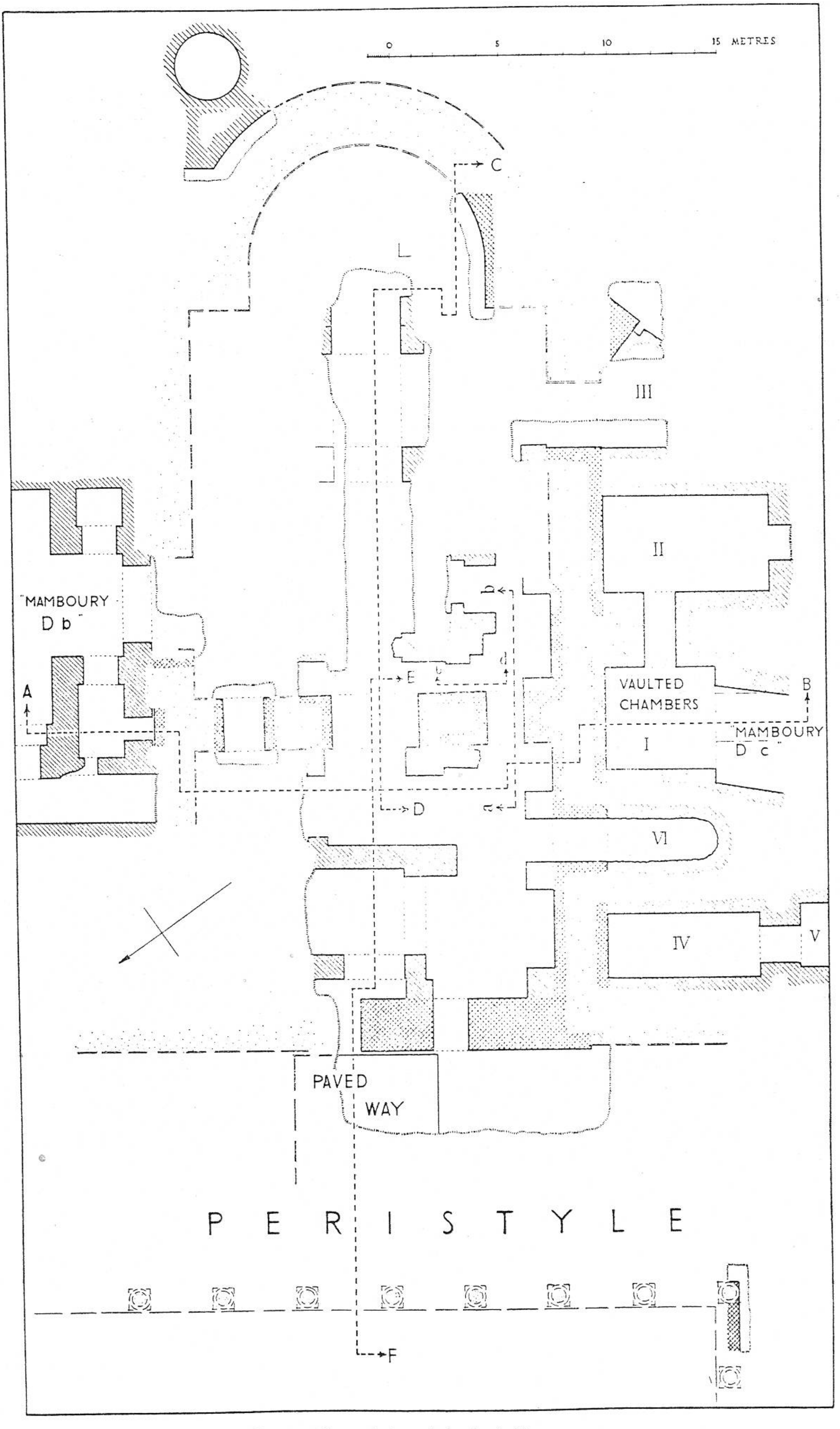
0
5
10
15 METRES
C
L
III
II
"MAMBOURY
D b"
A
b
d
c
E
D
a
VAULTED
CHAMBERS
B
I
"MAMBOURY
D c"
VI
IV
V
PAVED
WAY
PERISTYLE
F

FIG. 9. General plan of the Aygir Deposu area.

socket at the other.[1] The pipes were joined in this case with fine white fibrous plaster, wrapped round with a binding of hay. Similar pipes were found below the level of the mosaics, but above earlier walls, on the south-east side of the Peristyle (see p. 22).

(6) THE SOUTH ANGLE OF THE PERISTYLE STYLOBATE (Fig. 9, bottom right-hand corner and Fig. 10). Examined by D. T. R. and G. U. S. C. in 1953.

Only a small trench was possible at this point, but within it, at a level of 50 cm. below datum, were exposed parts of several blocks of squared stone constituting the south-west outer angle of a wall running north-west and south-east and breaking back at right angles towards the north-east. The line of this wall is continued south-eastwards by a second wall; but this is of different masonry, and the presumption that the former represents the outer south angle of the stylobate (the inner angle is inaccessible) is confirmed by the positioning of the dovetail cramps by which the blocks were secured. The secondary masonry perhaps represents a feature corresponding to the arched foundations at either end of the north-east stylobate, but it could not, on this occasion, be examined further.

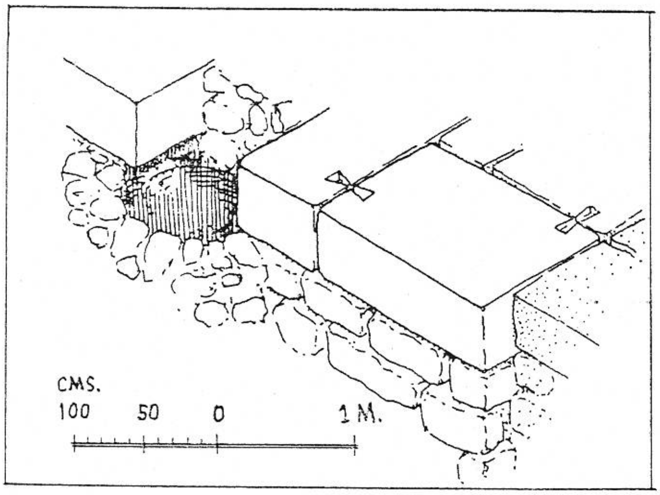

FIG. 10. Detail of south corner of Peristyle stylobate.

(7) THE MIDDLE OF THE SOUTH-EAST PORTICO (Fig. 9; Pl. 4, A-D). Trial-trenched by the previous excavators with inconclusive results (Site K, *G.P.*, p. 14). Two substantial areas were cleared in 1954, the first, slightly to the south-west of the axis of the Peristyle, by D. T. R., and the second, on the line of the Paved Way, in part by D. T. R., in part by J. B. W. P. and D. O. For practical reasons it was not possible to keep more than a part of the

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[1] Similar pipes have been found in more than one excavation at Constantinople, notably in the neighbourhood of the Myrelaion; see *Byzantion*, viii, 1933, p. 172.

excavation open at any one time, and observation was further hampered by the dangerously loose character of the superficial fill.

The line of the south-east outer wall of the Peristyle had been determined by the previous excavators at its north-east corner (*G.P.*, p. 6). The purpose of the subsequent excavation was to confirm the presumed rectangular plan of the Peristyle, to establish, if possible, its relation to the buildings known to lie beyond it to the south-east, and to discover whether mosaics survived on this side of the court.

The first objective was achieved without difficulty. A substantial length of the outer Peristyle wall was located running north-east and south-west precisely on the line indicated at its north-east end, thus establishing beyond question the perimeter of the Peristyle. Its relationship to the adjoining structures presents, on the other hand, a more complex problem, since in this central section it was found to have been built of good limestone masonry, and it had, in consequence, been heavily robbed by later builders in search of good building stone; and, built across its remains, at right angles to it, was a massive Turkish foundation, which divides the excavated area into two unequal parts.

Within the narrow space available to the south-west of the Turkish foundation a short stretch of the inner, north-west face of the foundations of the Peristyle wall was recovered at a depth of 1·25 m. below datum (4·5 m. below the present surface). It is of two distinct builds (Pl. 4, A). The north-eastern part, projecting from beneath the Turkish foundation, is a continuation of the same massive limestone foundation as was exposed in the second trench, to be described in the next paragraph. It breaks off sharply at right angles about 2·4 m. south-west of the south-west face of the Turkish foundation, and up against the end of it, set back 15 cm. from the line of the stone foundation, is built a footing of the same mortared rubble as is used elsewhere in the foundations of the Peristyle wall, wherever these were built free-standing. It will be noted that the point of junction between the two builds approximates to, but does not coincide exactly with, the line of the outer face of the stone foundations of the south-west wall of the Apsed Hall (the latter falls about 75 cm. south-west of the actual point of junction). Unfortunately, it was not possible to clear the other face of the wall at this point, in order to examine the relationship between the two structures more precisely.

To the north-east of the Turkish foundation it was possible to expose a rather longer stretch of the Peristyle foundations, together with a well-preserved section of the vaulted substructures adjoining it to the south-east (which will be described in the following section, p. 26) and, butted up against its north-western face, the south-east end of the Paved Way. For the foundation of the Peristyle at this point use had been made of a massive stone wall, 2·35 m. thick, and standing in places nearly 5 m. high. It rests on a footing course 45 cm. high at a depth of 7·5 m. below datum and projecting 15 cm. from the south-east face (the only face examined), and it is carried up in roughly levelled courses varying in height from 35 to 65 cm. The individual blocks are coarsely punch-dressed, in many cases with deep parallel striations, and are bedded in a hard, pink mortar. In two places the wall is interrupted by openings, the first, 1·58 m. wide, at a distance of 5·75 m. from the end of the stonework observed in the previous trench, and the second, which must have been considerably wider, and which is represented only by the south-east jamb, at a point 3·4 m. further to the north-east, roughly on a line with the middle of the Paved Way. The only distinctive feature of either opening is a block, bevelled on the under side, which projects from the uppermost surviving course on the north-east side of the smaller of the two, and which presumably served as the seating for an arch of brick or stone (cf. the springing mouldings of the 'Triple Arch', p. 29). The purpose of the two openings is not at all clear, more especially as the second gave directly on to the brickwork of the end of the Paved Way. Possibly, like the arch in the foundations of the south-west outer wall of the Apsed Hall where they straddle a pre-existing wall (see below, p. 26), they are to be explained in terms of some deeply buried features that the builders found it easier or more prudent to bridge over than to demolish or incorporate.

The structures lying to the south-east of the stone Peristyle foundation will be described in the following section (p. 24 ff.). The only early feature exposed on the north-west side was the Paved Way. The end of this was damaged when the stone wall was robbed, but enough remains of the original vertical face (Pl. 4, B, visible below the ranging pole) to make it quite certain that the stone wall was already standing when the brickwork of the Paved Way was built against it. An irregular, earth-filled space in the body of the brickwork below this face, up against the stonework (see Fig. 9), represents no more than the economy in the use of actual masonry that is characteristic of the whole structure of the Paved Way. It was possible to clear a short stretch of the south-west face (Pl. 4, B), revealing the same stepped structure as noted above (p. 13), though in rather better-quality masonry than elsewhere. The bricks measured 36×36×4 cm.; the mortar was of good quality, each course being a little thicker than those of brick. The surface of the mortar is trowelled at an inclined angle, flush with one brick and about

2 cm. behind the edge of the next. To have exposed the north-east face at this point would have meant shifting many tons of loose rubble, and was therefore not practicable.

Within the area examined no trace survives either of the marble pavement found within the north-east portico or of the levels immediately underlying it, and it cannot therefore be stated definitely that the mosaic continued round this fourth side of the Peristyle. The presence of tesserae in the filling, however, suggests that it did, a supposition supported by the discovery of a drain at a level of about 1 m. below datum. This corresponds in position with the drain found at the north-west end of the south-west portico (see p. 17). It is of exactly the same type, and was probably, like it, contemporary with the mosaic floor.

THE PERISTYLE: SUMMARY OF RESULTS

Before turning to the buildings that lie beyond the Peristyle to the south-east, it will be useful to summarize the principal results of our enquiries within the Peristyle itself.

The earliest building so far identified within the Peristyle area is that found beneath the pavement of the south-west portico. From the associated finds it cannot be earlier than the fourth century, and, to judge from its orientation, it may well have nothing whatever to do with the Palace.

Apart from the stone wall against which the south-east end of the Paved Way was built (which will be discussed in the following section, p. 49), the earliest structure belonging to the Palace is the Paved Way itself. At its north-west end this is unequivocally earlier than the mosaic pavement; at its south-east end it is built up against, and not earlier than, the stone foundation that carried the central part of the south-east outer wall of the Peristyle, and which later formed an integral part of the main structure of the great Apsed Hall. When it was built, ground-level stood, or was planned to stand, at or very near the level of its own pavement, at any rate on its north-east side; in other words, it was either later than, or itself part of, the southward extension of this corner of the upper terrace of the Great Palace. Its purpose must have been to provide a monumental approach to some isolated building or group of buildings standing on the edge of the terrace, approximately on the site of the Apsed Hall.

During the second period, when the whole area was remodelled to receive the Peristyle Court, there was no axial entrance from the north-west, and that part at any rate of the Paved Way which lay within the north-west portico went out of use. What happened during this period to the central stretch of the Paved Way, running across the open space within the Peristyle, there is no direct evidence to show. The slight obliquity of the axis of the Paved Way and the probable positioning of the columns of the portico in relation to it, both suggest that it had gone out of use; on the other hand, the reopening in the following period of a large door in the middle of what had been the north-west portico (p. 12), with steps leading down to courtyard level, might not unreasonably be taken to imply that there was still a path leading across the courtyard at this point. In either case the building of the Peristyle represents a substantial advance on the original plan. Instead of a single line of approach leading to an isolated structure, we have a monumental courtyard connecting a number of buildings grouped around three of its sides, of which that towards the south-east was still the most important.

The second period lasted long enough for the mosaic to need substantial repair; we cannot follow the previous excavators (*G.P.*, p. 8) in interpreting the careful patching of the mosaic in *opus signinum* as contemporary with the laying over it of the marble pavement. Then some violent destruction, probably an earthquake (*G.P.*, p. 9) made extensive rebuilding necessary. The north-east portico became a marble-paved corridor, with doors opening on to the central open space. At the same time a large door, with steps leading down from the rooms beyond, was opened in the middle of the north-west wall. We again cannot follow the previous excavators in dating this necessarily to the time of Justinian.

Later again, but still presumably within the Palace period, the corridor was narrowed. The site was then abandoned and used as a dump for rubbish. Finally, after an interval represented by the remains of a house built upon the ruins of the north-east corridor, it was laid out afresh by Turkish architects in the early seventeenth century.

CHAPTER II

BUILDINGS SOUTH-EAST OF THE PERISTYLE

AS we have seen in the previous chapter, the sequence of structures in the Peristyle area can only be understood as successive methods of providing access to certain important buildings on its south-east side. This site, which lies within the Aygir Deposu, was not available for excavation before the war, and the main information about its Byzantine topography before the start of the present excavations was the result of investigations by E. Mamboury and Th. Wiegand.[1] They identified two groups of substructures adjacent to the area in which the Peristyle later came to light, one ('Mamboury-Wiegand Db') prolonging the line of the north-east portico, the second ('Mamboury-Wiegand Dc') adjoining the south corner. Occupying the space of some 22 m. between the two, along the south-east side of the Peristyle, was a large building whose foundations of limestone blocks abutted on the previously explored vaults. Its axis corresponds with that of the Peristyle, and it was obviously the most important structure on this side (Fig. 9).

One of the chief tasks of the excavations was to recover the plan of this building (the Apsed Hall), to investigate the structural sequence on its site and to relate it, if possible, to the adjacent buildings. The nature of that relationship is clearly indicated in the longitudinal section (Folders A, B), which will be discussed below. Two factors limited our work here: quarrying, probably by the builders of the Sultan Ahmet mosque quarter, which had destroyed virtually the whole of the 'piano nobile'; and two successive terracing operations, in the layout first of the Palace and then of the mosque, which had produced foundations of enormous depth and had subsequently overlaid their remains with many metres of loose soil and debris. The plan of the massive limestone wall that outlined the building could be intermittently recovered, and where the internal cellar-vaults supporting the original floor remained intact, they too could be surveyed without great difficulty; but the examination of the lower parts of these vaults, which were filled almost to roof-level with the accumulation of centuries, and the investigation of collapsed or destroyed parts of the substructure elsewhere, entailed excavation to a dangerous, and at times impossible, depth.

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[1] Mamboury-Wiegand, pp. 32-4. The general plan which should have accompanied this work was published in *Gnomon*, 1936, p. 222, and reproduced by A. M. Schneider, *Byzanz*, Berlin, 1936, pl. X.

The building is almost rectangular, *c.* 32 × 16·5 m., with an apse 10·9 m. in diameter, projecting 7·5 m. from the south-east end. These measurements are internal; where the outer faces of the walls are visible, they vary in thickness from 2 to 2·5 m., and are built of roughly dressed limestone blocks laid in courses of *c.* 40 cm. A transverse wall, incorporating a large central and two smaller side arches (the 'Triple Arch'), divided the interior into an antechamber 11·5 × 16·5 m., and a hall 17 × 16·5 m. with the apse at the far end. These massive walls clearly reflect the basic layout of the building above; on the lower level, which we were examining, the space between them was filled with brick vaults supporting the upper floor. These vaults have survived intact within most of the area of the antechamber, but in the main hall beyond they have collapsed or been removed, together with much of the masonry of the end wall and the apse.

The parts of the structure which we investigated were:

(1) *The substructures beneath the antechamber.* Here we recovered the plan of the latest phase by clearing the vaults down to the top of their supporting piers, but we were unable, except at one point, to examine the remains of the earlier structures on which the later ones probably rest, since the complete evacuation of the chambers would have involved a serious risk of their collapse.

(2) *The area beneath the main hall.* Our first step here was to drive a long, exploratory trench on the axis of the building towards the middle arch of the transverse wall. This revealed parts of the substructures which had supported the floor of the 'piano nobile'; but again we could not dig deep enough to expose their footings and to clear the earlier masonry of which traces appeared at a depth of some 7 m. In the final season, therefore, an area *c.* 6 × 5 m. was opened in the west corner of the hall, where the south-west outer wall of the building and the transverse, arched wall promised safety on two sides of the trench; here we reached the footing of the south-west wall, resting on bedrock at a depth of over 13 m. from the present surface. This gave us sufficient information to distinguish the sequence of earlier buildings on the site, though we could naturally recover very little of their plan.

(3) *The south-east end of the Apsed Hall*, where we confined ourselves to tracing the course of the outer wall.

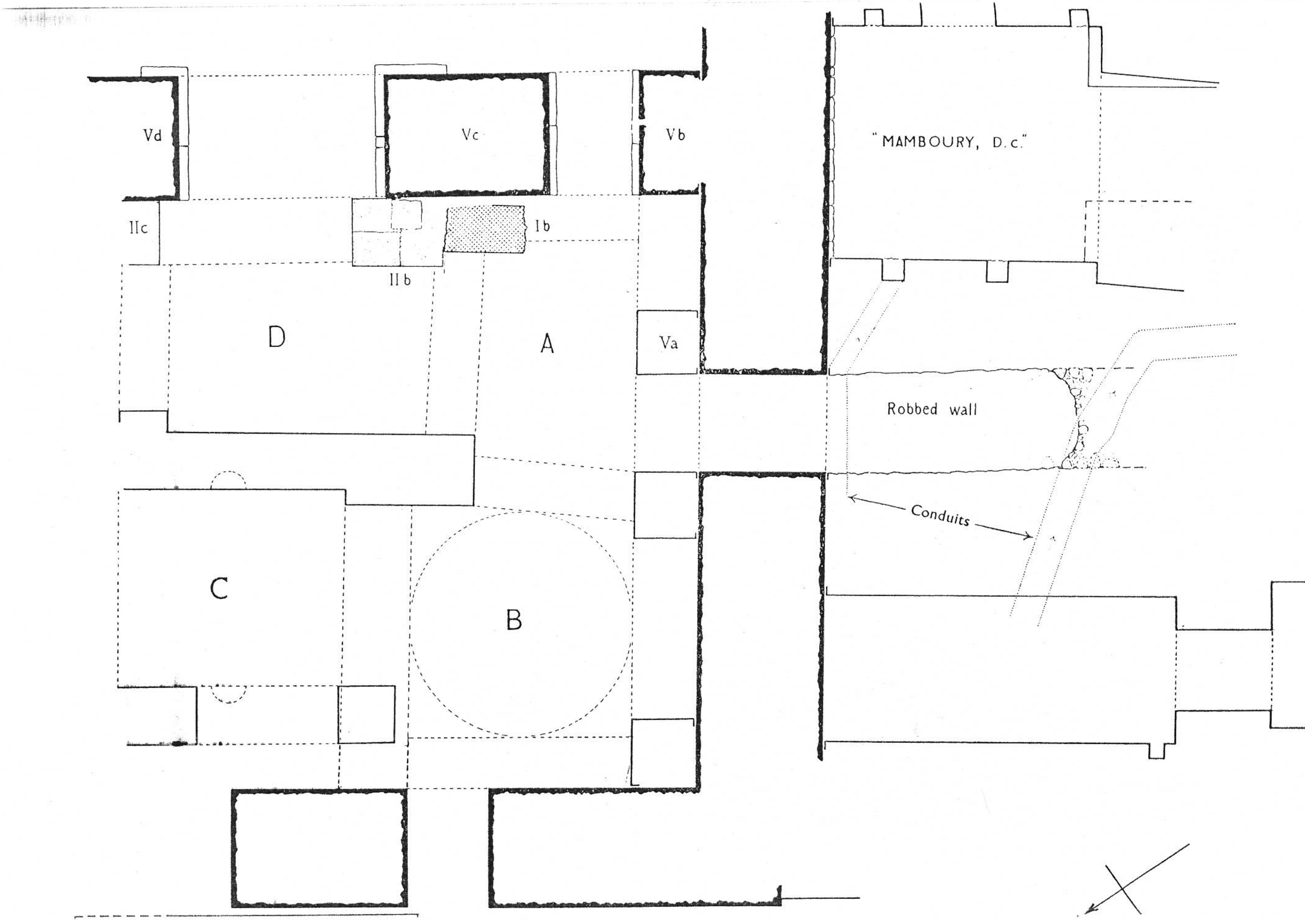
(4) *Vaulted chambers adjoining the Apsed Hall to the south-west*, where we

were able to reach foundation-level. The structures beyond these vaults, hitherto believed to be a part of the same complex ('Mamboury-Wiegand Dc'), proved on examination to be unquestionably Turkish, although they overlay a system of Byzantine cisterns.

(1) THE SUBSTRUCTURES BENEATH THE ANTECHAMBER (Fig. 11; Folders A, B and C; Pls. 5-10). Exposed by D. T. R. and G. U. S. C. in 1952 (see *Illustrated London News*, Dec. 12, 1952), and more fully excavated by D. T. R., J. B. W. P. and D. O. in 1953; surveyed by G. U. S. C. The condition of the vaults and the great depth of loose fill within the chamber made excavation extremely hazardous, and absolutely precluded digging down to the deeper levels. Chamber C, briefly examined in 1952, was inaccessible in 1953.

The description that follows is the result of partial clearance only, to an average level just below the springing of the vaulting, i.e. about 4 m. below the floor of the 'piano nobile', as represented by a fragment of marble pavement *in situ* (Pl. 3, B) at the north-west end of the building (=3·5 m. below datum), and 6·5 m. above the footing of the transverse arched wall. Consequently the plan represents almost exclusively the latest building period, and even this may be incomplete; what appears at this height to be a blank wall may be supported on an arch below, whereas a visible arch may rest on a pier or wall of an earlier period. Approximately two-thirds of the area beneath the antechamber was examined; the north-east end was found to be completely filled with debris and was therefore inaccessible.

The stone wall outlining the building was located on three sides, and the fourth was delimited inside by the transverse arched wall (the 'Triple Arch') and outside was in one place visible through an opening from Mamboury Db. The north-west wall, which is identical with the central part of the outer south-east wall of the Peristyle, has already been described (p. 21). The south-west wall, the internal junction of which with the north-west wall is masked by one of the brick piers supporting the vaulting, is visible at three points within the substructures of the antechamber. It was slightly thicker (2·5 m.) and built of rather better dressed, but still obviously re-used, blocks, laid in regular courses of 40-60 cm., and bedded in a pink mortar indistinguishable from that used in the north-west wall, or indeed from that used in any of the stonework throughout the building. A single arched opening (Pl. 5, A; beyond the central brick arch), 1·96 m. wide and 6·2 m. from the inner west angle, gives on to a tunnel of the same width and just over 4·5 m.


Vd
Vc
Vb
"MAMBOURY, D.c."
IIc
Ib
IIb
D
A
Va
Robbed wall
Conduits
C
B

long, which appeared at first sight to have been cut out of the core of the mass of masonry beyond. Closer examination, however, revealed that this mass of masonry, which separates two of the vaults abutting on the south-west side of the stone building (see below, p. 47), was built against and over an earlier wall, running north-east and south-west; and it was the subsequent removal of this wall that formed the tunnel. The sides of it still preserve the mortar, with a high content of brick nodules, with which the surface of the wall was coated when the later masonry was applied; and at the far end of the tunnel can be seen a section through the surviving continuation of the wall in this direction, showing that it had a core of mortared rubble faced with courses of small, roughly squared limestone blocks (3 courses to 48 cm.). The purpose of the stone arch, which was eventually used to gain access to the robber tunnel, is not clear; but a possible explanation is that the builders of the great stone foundation, finding the earlier wall across their path, preferred to vault it over rather than either to dig through it, or to risk unequal subsidence by resting their masonry partly upon it. That it remained in position after the stone wall was built is shown by the presence of two conduits, broken into from below by the stone-robbers, but originally bedded upon it. One of these discharged into one of the two vaults abutting against, and at least structurally later than, the stone building (Fig. 11).

The north-east wall was located on the inside at its junction with the transverse wall, and on the outside at the end of one of the openings out of the structure termed by Mamboury 'Db'. Its structure in both places was identical with that of the south-west wall. It was not possible to examine it in detail.

The transverse arched wall (Folder C) that divides the substructures of the antechambers from that of the Apsed Hall presents a more complex problem, since it apparently represents a change, made during the building of the foundations, in the proposed layout of the building they were to carry. The original plan seems to have envisaged a transverse wall with a wide central arch and two narrower side-arches, built in part of stone but little more massive than these on which the other vaults were carried; its function would have been to support the floor, and also perhaps a light screen wall separating the antechamber from the hall of the 'piano nobile'. Its position seems to have been determined, or at least recommended, by the presence of piers of 'greenstone' and brick surviving from an earlier building on approximately the desired line (Fig. 11, piers Ib, IIb and IIc; see below, p. 32).

The first stage was the construction of two stone piers against the south-west outer wall, one of them at the south corner of the antechamber rising to a height of about 6 m. above the foundation (piers Va and Vb); their masonry is similar to, but not bonded with, that of the wall behind. They project 1·22 m. from the face of the wall; the angle pier was originally 1·52 m. wide, the other 1·25 m. On these two piers, against the south-west wall, rested a stone arch of seven voussoirs (Pl. 6, A), of which the three comprising the south-east quadrant of the arch were stepped out until the third projected 30 cm. beyond the face of the piers, and the upper surface of this voussoir was then bevelled to provide the seating for a second, transverse arch. The other end of this arch rested, with a few levelling courses of brick, on the broken pier of earlier brickwork previously mentioned (pier Ib); two large voussoirs on this side remain in position (Pls. 6, B, left, and 8, C), but the rest has fallen. This was the small, south-west arch of the original transverse wall. The significance of the earlier brickwork will be examined at a later stage. At this point it is sufficient to record that its line is continued to the north-east by a pair of 'greenstone' piers, which were re-used as the spring of a wider, central arch, a few voussoir-bricks and the plastered intrados of which can be seen incorporated within the added brickwork by which it was later strengthened (Pl. 9, C, D). These two arches, with the third at the north-east end, the existence of which we verified, but which we could not explore below the springing of the arch, provided a transverse foundation rather less than a metre thick to carry the superstructure and vaults alike.

The change of plan, which necessitated a drastic strengthening of the transverse wall, implies that it was now required to support a heavy partition dividing the two chambers of the floor above. The south-west pier (Vb) was extended southeastwards along the outer wall, almost doubling its width; the arches that radiated from the original masonry were left in position, but four courses of limestone blocks, with a total height of 1·8 m., brought the pier up to the spring of a new transverse arch, marked by a simple bevelled moulding projecting from the topmost course and designed to carry the centring for the arch. These four added courses were rebated 55 cm. from the south-east end of the extended pier, to provide a new seating, at the original level, for the brick arch springing along the outer wall in this direction (Pl. 12, A, and Fig. 11, A and B). At the same time a pair of massive new limestone piers (Vc and Vd) was built alongside the old, improvised brick-and-'greenstone' footings (Pl. 9, A, B). The south-west lateral opening, now somewhat narrowed (1·75 m.) was spanned by a stone barrel vault, resting in part on the new pier, in part on the existing stone arch. Despite their preoccupation with strength, the builders were not above improvising brick substitutes for missing voussoirs, nor haphazard packing with brick and stone where an awkward angle presented itself, as we can see at both ends of this archway. The central brick arch was left in position, but strengthened by the insertion of a lower, narrower arch (diam. 3·65 m.; visible in Pl. 9, C, D, encasing the masonry of its more slender predecessor); and a wider stone arch, founded on the newly constructed pier, was added along its south-east side; most of the voussoirs of both the new brick and stone arches are missing.

These additions give the cross-wall a total thickness of more than 3·5 metres. In general, the improvised supports provided by the earlier layout were used to carry the vaults beneath the floor of the antechamber, while the new arches bore the weight of an upper wall, and must also, though the evidence is lost, have provided the seating for further vaulting beneath the floor of the main hall. The thickness of their masonry, nearly 2·5 metres, is comparable with that of the outer foundation walls, and give some idea both of their structural importance and of the extent of the change implied by their insertion. We have no knowledge of the form of the inner façade they were designed to carry, but the triple-arch system has no function below ground, and must assuredly reflect the upper plan.

It remains to describe the vaults enclosed within these walls, and the remnants of earlier buildings that preceded them. The area we explored was divided into four chambers (Fig. 11, A, B, C, D) by three arches and a wall, all radiating from a central pier. The arch between chambers A and D (visible on the extreme left of Pl. 7, C), whose voussoirs have largely fallen, was supported at its other end on the brickwork associated with the first phase of the transverse wall, seated at this point on earlier masonry (see p. 33; also Fig. 13). The arch between chambers A and B, the crown of which is broken, was carried on a brick pier built against the inner face of the stone foundation wall, immediately beside the arched opening, that marks the line of the robbed early wall described above (p. 26). The far end of the arch between chambers B and C, which again has partly collapsed, was grouted into the inner face of the north-west stone wall, and was also reinforced by being incorporated in a brick pier, built just within its span at a distance of 90 cm. from the stone wall. These three arches together define the chambers marked A and B on the plan. In addition to the arches, brick arcading was built along the faces of the two outer stone walls, to carry the other sides of the vaults (Pls. 6, A, and 7, B).

Room A has a pitched-brick vault, whose south-east end starts from an improvised wall of stone and brick surmounting the small stone arch which, as we have seen, belongs to the earlier phase of the transverse wall; its north-west end starts above the arch separating chambers A and B, and it is finished in the middle with an irregular wedge of bricks laid radially. It is well preserved except at the south-east end (Pl. 5, B). Room B has a low, domical vault, the crown of which has fallen: it rests on continuous pendentives over a shallow-armed cross formed by the brick arches built along its four sides (Pl. 7, A, B). On the south-east and south-west sides, the crowns of these arches are truncated by the brickwork of the dome. The north-west arch, which is of a curvature wider and lower than its span (width at the spring 4·4 m., height above the spring 90 cm.), gives access at its north-east end to the smaller of the two openings in the stone wall behind. The voussoir bricks are barely visible on the inner face, and the whole was strengthened by an outer, concentric relieving arch visible on the outer face. The arch was weakened after its construction by the cutting of an irregular rectangular hole up through the pendentive and the adjacent courses of the dome in the north corner of the chamber. This pierced through the vaulting bricks (a thickness of 35 cm.) and through the packing above them, and was then rebuilt in a sort of half-barrel (visible externally, Pl. 4, C). Above the vault it cut through a drain beneath the marble pavement of the 'piano nobile', which we recovered at this point (see below p. 33), and it must be a later feature; it was subsequently blocked.

Chambers C and D are barrel-vaulted, C with bricks laid radially, D with pitched bricks, starting from the north-east and south-west ends. One side of each vault rests on the partition wall between the two chambers, which runs from north-east to south-west across the building. The north-west side of the vault in chamber C rests on a brick wall, set parallel with and distant 90 cm. from the face of the north-west stone wall; this wall is carried on an arch, at a much lower level than the other arches built to support the internal vaulting, with a concentric relieving arch visible on its outer, north-west face (Pl. 4, C, and detail of brickwork, Pl. 4, D). Above the relieving arch the outer face is carried up to the height of the crown of the interior vault before turning over in a small half-barrel vault to rest against the now vanished stone masonry; immediately below the top of this half vault, at its extreme south-west end, a drain from the floor above discharges into the gap between the two walls. The low brick arch, on which the north-west wall of chamber C rests, is supported at its south-west end on a pier of composite masonry (Folder A). The attempt to reach the footing of this pier was unsuccessful, but it was seen to be founded at least as deeply as the stone wall; its masonry consists of five courses of small limestone blocks immediately below the spring of the arch (5 courses to 80 cm., set in white mortar), resting on four courses of bricks (height 37 cm.) followed by at least five more courses of limestone (visible height 65 cm.).

Just above the spring of the arch a quadrant of bricks connects the north-west face of the pier with the face of the stone wall, and carries the north-west end of the arch separating chambers B and C, which is further supported by brickwork resting directly on the composite pier.

In simple terms, this elaborate arrangement means that the arcading supporting the side of the vault against the stone wall was suddenly stepped out to leave a gap of nearly a metre; and in view of the difficult adjustments entailed, the only plausible explanation would seem to be that such an arrangement made it possible to found some part of the supporting piers on pre-existing structures. Such pre-existing structures there certainly were, as we know from the adjoining chamber, D, where we were able to expose the remains of no less than two preceding structural phases, both incorporated into the piers carrying the vaulting in the Apsed Hall period. The vault of this chamber is of the usual pitched-brick type (Pl. 7, C, D), resting at the north-east end against an arch, now blocked with earth, which divided the chamber from the unexplored area beyond. Despite the collapse of the arches on the south-west and south-east sides, the vault itself is still in good condition. It sprang on the north-west from the wall common to chambers C and D, and on the south-east from the large brick arch spanning the central opening of the transverse footing between the antechamber and the Apsed Hall, in the form in which this footing was originally planned (see above, p. 29). This brick arch was seated on two elongated piers of 'greenstone' masonry (piers IIb and IIc), of which we were able to clear four courses of the north-east pier and ten of the south-west, before being stopped by the dangerously loose character of the filling; the blocks are roughly punch-dressed, and bedded in white mortar in courses varying from 25 to 40 cm. in height (Fig. 11 stippled; Pls. 8, A, B, and 9, A, B, south-west pier; Pl. 9, D, north-east pier). The brick arch that rested on these piers and carried the vault of chamber D was not an original feature. It replaced an earlier arch, on the same line, but higher; and the 'greenstone' piers are themselves part of an earlier building, to which belonged a corresponding pair of piers, also of 'greenstone', 3·8 m. to the south-east, beyond the great stone transverse footing (the 'Triple Arch') (Figs. 12 and 13; piers IIa and IIb). The barrel-vaults linking these two pairs of piers were subsequently destroyed to make way for the stone footing, but bevelled seatings for such vaults are still in place (Pls. 7, 8, B, and 9, A), and in the case of the south-east pair have been used in the succeeding period to carry buttressing half-arches up to the south-east face of the transverse stone wall (Pl. 14, C, E, and Folder B).

Traces of a yet earlier building came to light beneath the south-east end of the arch dividing chambers A and D. Here the south-west end of the 'greenstone' pier (IIb) could be seen to have been grouted into what remains of an earlier brick pier (pier Ib, Fig. 11, and Pl. 8, A, C), the south-west face of which has been cut back, while on the north-west face four voussoir bricks mark the spring of an arch, which has been similarly cut back, but which formerly stood on the approximate line of, but 1·5 m. lower than, the later arch separating chambers A and D. The brickwork of the early pier is readily distinguished by the pure white colour of its mortar from that of the vaulting later built upon it, which, in common with the walls of this period, uses a mortar containing a high percentage of crushed brick, often in large nodules.

Thus we have, beneath the antechamber, positive evidence of two, and very possibly three, structural periods earlier than the first phase of the stone building —the two structures just described and the enigmatic wall of which the robbed traces came to light in the tunnel opening off chamber A (p. 28). In one case, too, that of the arch between chambers A and D, we have positive evidence that the structure carrying the vaulting of the antechamber followed the line of, and at least in part rested on, some of these earlier features. It seems not unreasonable to explain all the irregularities in the plan of the antechamber substructures in similar terms; but until these substructures have been cleared down to bedrock (an operation that would involve stripping the entire area and consolidating the existing vaulting) it is hardly possible to do more than state the probability; the evidence for a more precise statement of the relationship is not available.

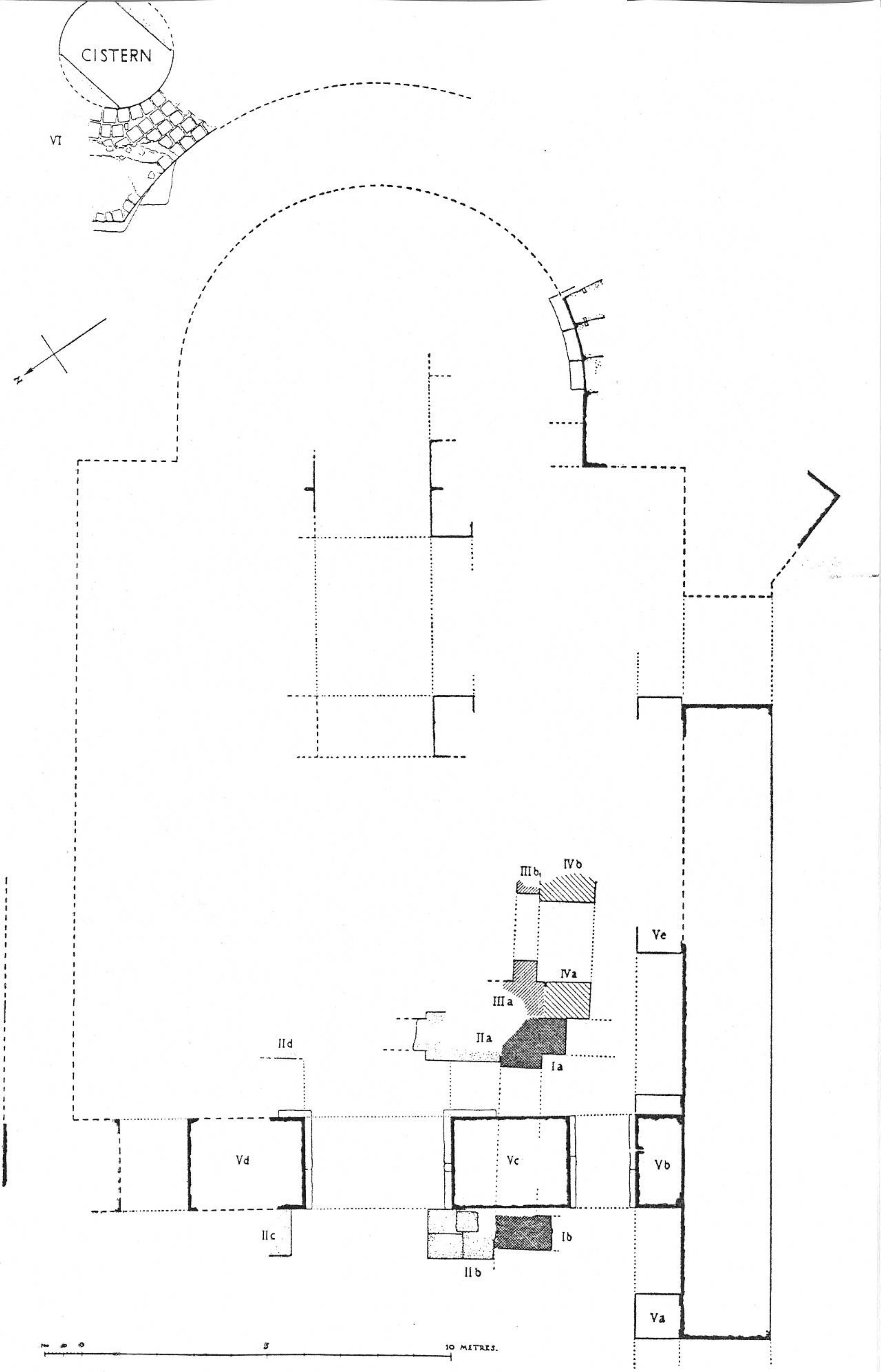
The antechamber substructures were evidently accessible, but their primary function was unquestionably practical, that of supporting the floor above with the minimum expenditure of materials and effort. Two niches in chamber C facing each other across the width of the chamber, one above the crown of the north-west arch and the other in the south-east wall, are the only features that we discovered suggesting any more ambitious purpose. It is, in any case, certain that the plan of the partitioning walls and arches bears no direct relation to the layout of the antechamber above (the surviving fragment of the latter's paving, about to be described, overrides the north-west wall of chamber C); and it is a reasonable inference from the lack of any symmetrically placed supporting features that the antechamber itself was a plain, almost square room, marble-paved and without any internal subdivision. Of its walls, all that survives is a few bricks of the wall separating it from the Apsed Hall. About its pavement we are better informed, since a small stretch of marble paving survives intact near the middle of the north-west side, just within what must have been the entrance from the Peristyle. It consists of slabs of Proconnesian marble, badly splintered but recognizably in position, at a level of about 75 cm. above the mean level of the mosaic in the Peristyle (Pl. 3, B). It owes its preservation to having been built over by a later wall, of somewhat flimsy rubble construction, running parallel to and 1 m. out from the robbed face of the Peristyle wall. This later building was evidently detached from the Peristyle, and between the two ran a broad open gutter.

Within the substructures of the antechamber it was, as we have seen, impossible to obtain a clear picture of the earlier phases by reason of the dangerous condition of the vaulted chambers within which we were digging. This led us to investigate the earlier buildings in more detail on the far side of the transverse wall, beneath the west corner of the Apsed Hall, where the previous collapse of the vaulting and the presence on two sides of massive stone walls gave a reasonable prospect of being able to dig down to bedrock. Our results in this area are described in the next section.

(2) THE AREA BENEATH THE MAIN HALL (Figs. 12-15; Pls. 10-12). First investigated in 1953 by D. T. R., J. B. W. P. and D. O. in a long exploratory trench on the axis of the building, from the site of the apse to the central arch of the great transverse wall. At the north-west end, adjacent to the stone arch, this revealed traces of earlier structures which were further examined to a greater depth by D. O. in 1954, in the west corner of the hall.

The plan of the Apsed Hall itself is quite clearly defined (Fig. 12); the various substructures within it are complicated and by no means easy to disentangle. The earliest of them observed on the line of the 1953 trench was a pair of 'greenstone' piers already described in connection with the corresponding piers within chamber D, 3·8 m. to the north-west, beyond the 'Triple Arch' foundation (p. 32). The south-west pier of this pair (pier IIa; Fig. 12) showed evidence of re-use in two subsequent phases. After the suppression of the structure outlined by the four piers, it served to carry one corner of a pitched-brick vault presumably covering the same area, of which the first bricks remain in position overlying the spring of the 'greenstone' arch. This vault in turn was destroyed by the builders of the transverse 'Triple Arch', who used the original 'greenstone' seating to carry a brick half-barrel vault up to the south-east face of their great stone wall. These phases of reconstruction can be clearly seen on Fig. 13.

Owing to the loose and dangerous nature of the fill at this point it was impossible


CISTERN
VI
N
IIIb₁
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Va
0
5
10 METRES.

Fig. 12. Ground plan of the Apsed Hall.

to investigate these structures at a greater depth, except for the deep excavation at the western corner of the main hall. A detailed plan and cross-sections of this work are given in Fig. 13 (see also Pls. 10-12). The excavation extended for 7 m. north-east and south-east from these limits, exposing the south-west end of the 'greenstone' pier previously observed and revealing that it was in fact the second of five structural phases on the site (Pl. 11, B; Figs. 12, 14 and 15). These five phases are identified in the text and the relevant figures by the Roman numerals I-V; for convenience of reference, individual features of the same phase are marked Ia, Ib, and so on. It must be explained that these phases are structural and do not necessarily represent a substantial difference in date.

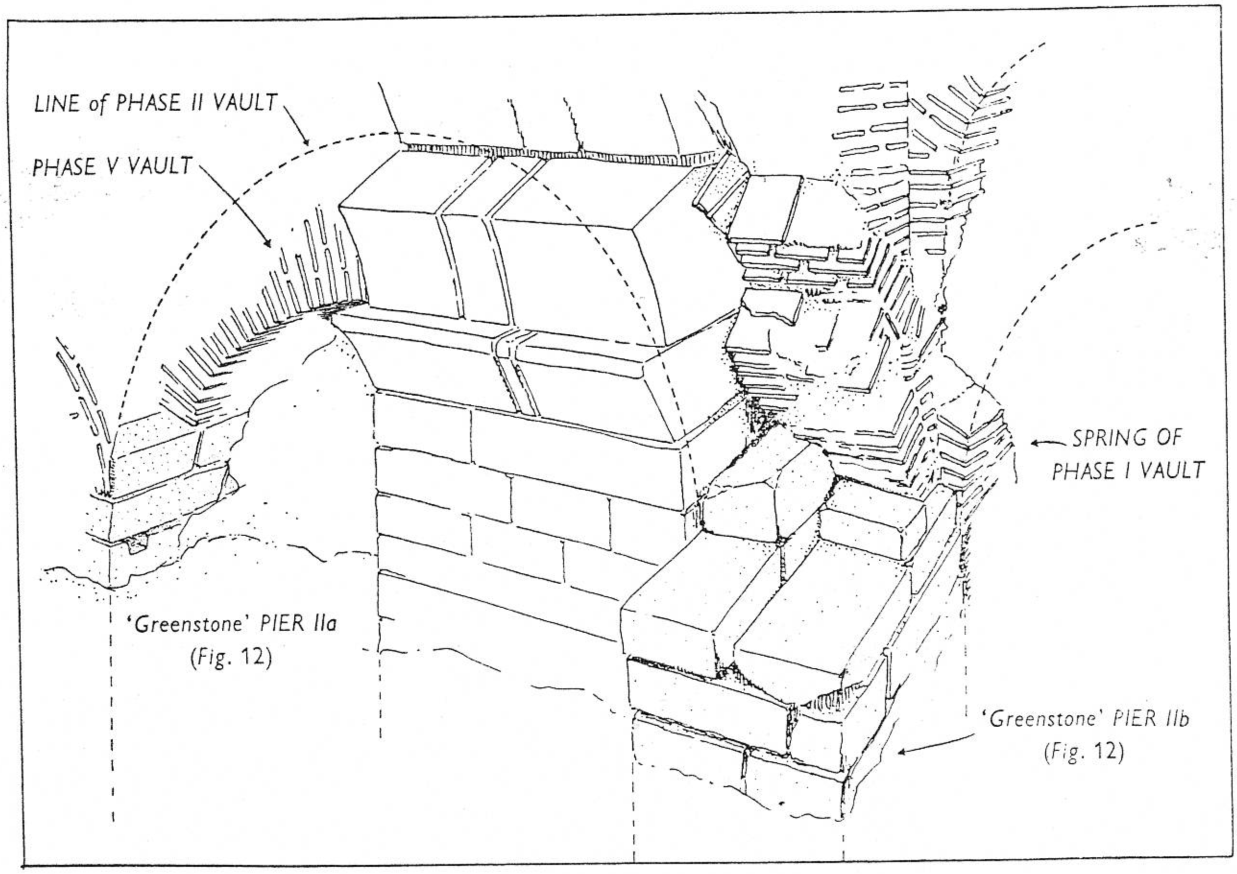

LINE of PHASE II VAULT
PHASE V VAULT
SPRING OF PHASE I VAULT
'Greenstone' PIER IIa (Fig. 12)
'Greenstone' PIER IIb (Fig. 12)

FIG. 13. Diagram showing successive building periods at junction of substructures of the Apsed Hall and its antechamber.

The first phase was represented by a pier (Ia) consisting of bands of brickwork

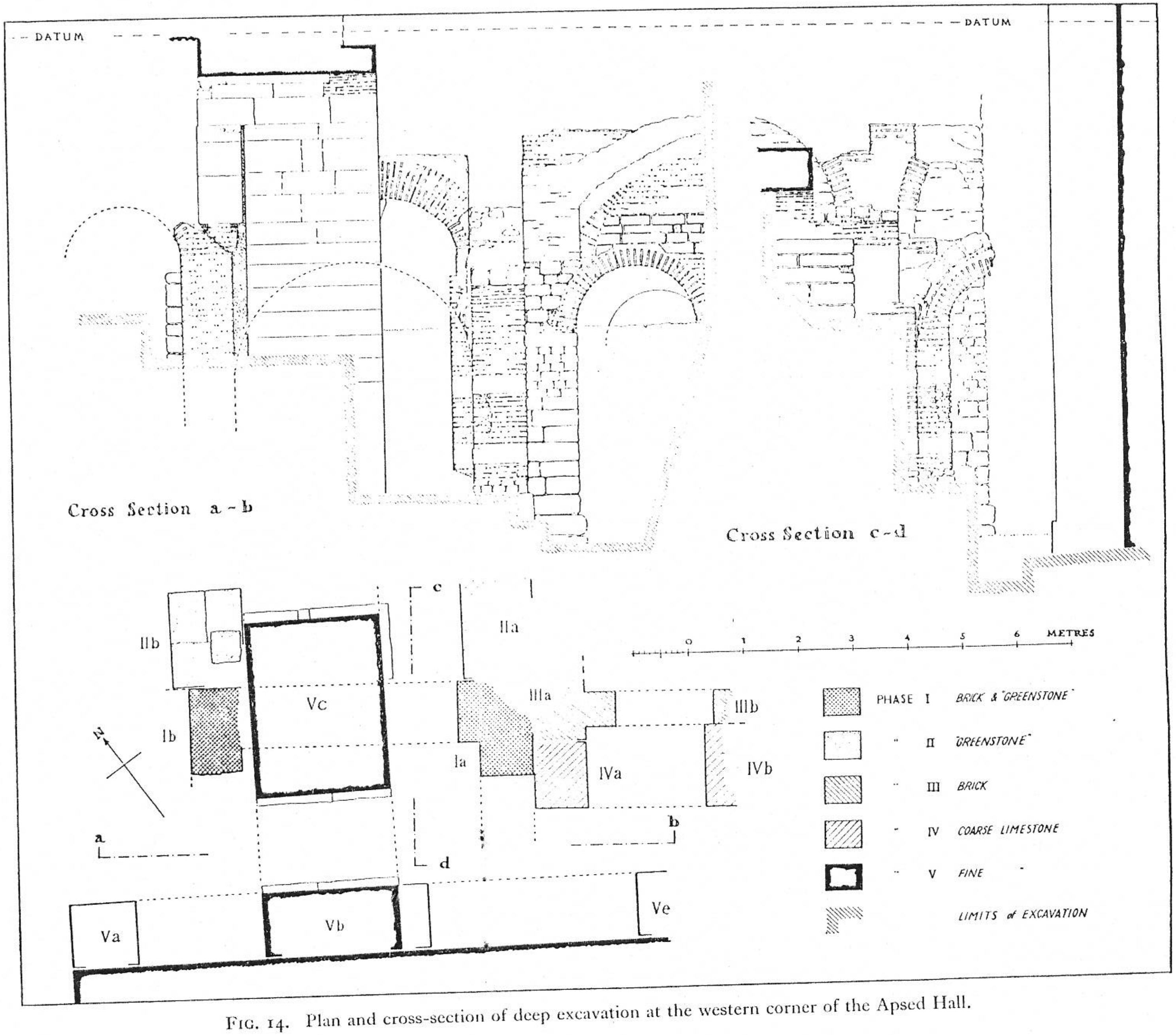

DATUM
DATUM
Cross Section a – b
Cross Section c – d
c
d
a
b
N
IIb
Ib
Vc
IIa
IIIa
Ia
IVa
IIIb
IVb
Va
Vb
Ve
0
1
2
3
4
5
6
METRES
PHASE I BRICK & "GREENSTONE"
" II "GREENSTONE"
" III BRICK
" IV COARSE LIMESTONE
" V FINE "
LIMITS of EXCAVATION

FIG. 14. Plan and cross-section of deep excavation at the western corner of the Apsed Hall.

(average 38 cm. square by 4 cm.; 10 courses to 92 cm.), alternating with single courses of 'greenstone' (height 28-30 cm.) (Fig. 15 and Pl. 12, B). The south-west end of the 'greenstone' pier (IIa) abutted directly on its north-east side, but the pointing of the brickwork on this face demonstrates that the composite pier is at least structurally the earlier of the two. It was founded on a footing of mortared rubble, which originally extended to the south-west but was later cut through by the foundation of the great stone wall on this side (see section C-D, Fig. 14). The pier supported brick arches radiating to the north-west and south-west; the soffit of

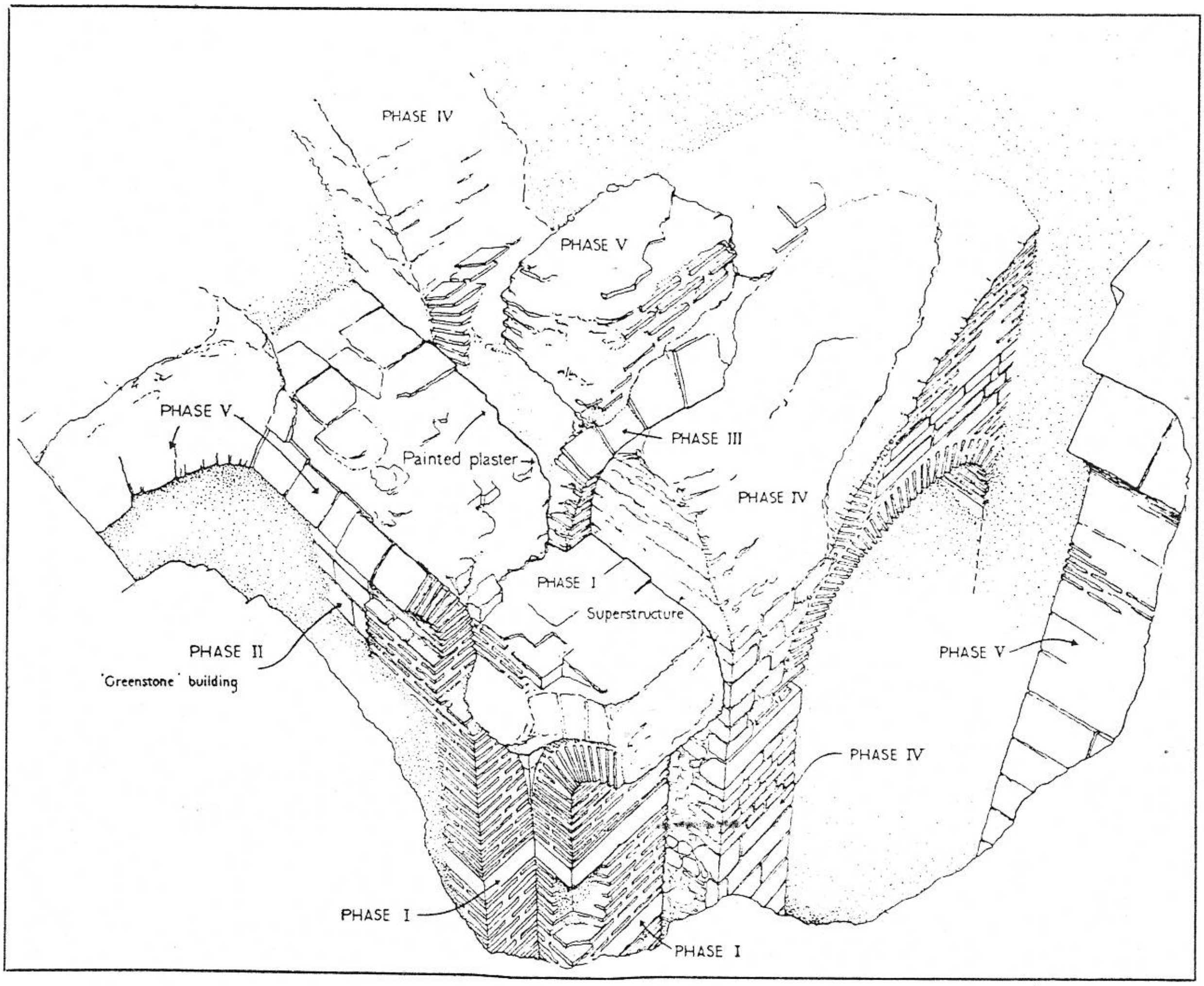

PHASE IV
PHASE V
PHASE V
Painted plaster
PHASE III
PHASE IV
PHASE I
Superstructure
PHASE II
'Greenstone' building
PHASE V
PHASE IV
PHASE I
PHASE I

FIG. 15. Phases of construction in the deep excavation at the west corner of the Apsed Hall (see Pl. 11, B, and Figs. 12 and 14).

the surviving stub of the south-west arch was not pointed, and fragments of mortar adhering to it suggest that it was originally blocked by a wall founded on the mortared rubble footing which continued in this direction. The other end of the north-west arch originally rested on the early brick pier within chamber A on the far side of the 'Triple Arch' (pier Ib; Pl. 8, c; Fig. 14), and in the angle between the two arches are visible the first bricks of a groined vault resting on a small limestone bracket. Above and behind the bricks in the angle of the vault, three courses of carefully pointed brickwork preserve the line of the superstructure that was founded on this pier and must have been built simultaneously with the vault (Pl. 12, B, top left, and Fig. 15). Further to the north-east its materials have been robbed, but the line of the wall is preserved by the survival of later masonry that abutted on its north-west and south-east faces. This makes it clear that it also overlaid the 'greenstone' pier, which must consequently have been contemporary at least with the groined vault; the apparent difference of phase in the piers at a lower level may be only structural, and the use of 'greenstone' at one point, and of brickwork banded with 'greenstone' at another, may reflect a simple difference of function. We have no evidence about the plan of the superstructure, but it is interesting to note that, whereas the surviving north-west faces of the masonry of this phase were coated with a coarse cement, the south-east face of the upper wall has produced fragments of a fine plaster decorated with bands of brown paint. The level at which this was found was considerably below that of any floor that could have been carried on the groined vault, and there must, therefore, have been in this phase a drop in the floor-level of the superstructures along the north-east to south-west line represented by the 'greenstone' and composite piers.

At all events the next building phase involved a considerable terracing operation, raising the floor-level of the superstructures and extending them for some distance over the slope to the south-east (Figs. 14 and 15, phase III). A new pier was built, abutting on the south-east face of the brick and 'greenstone' pier, and of the wall above, concealing the decorated plaster (pier IIIa). This pier is largely hidden by later and more massive reinforcements inserted on its north-east and south-west sides, but from above it can be seen that it carried arches, springing from a level some 2 m. higher than those of the earlier structure, on its south-west, south-east and north-east sides. In the angles between the arches the setting of the bricks indicates that the pier supported the adjacent corners of two groined vaults on the south and east. Only the south-east arch separating the two vaults, which was lower and smaller in span (*c.* 1·8 m.) than the others, survives intact; in the small area now visible the pier and arch are built entirely of brick (average 36 cm. square by 4 cm.; 6 courses to 58 cm.). In simple terms, this phase represents an extension of the upper terrace, supported by groined vaults, for a distance of at least 4 m. beyond the previous line, and a simultaneous raising of the floor-level by some 2 m.

At a later date this system required repair, and was reinforced by thickening the piers and inserting new arches and an inner skin beneath the vaults. We have termed this repair phase IV (Figs. 14 and 15). Much of the original vaulting was clearly still standing, since the upper face of the reinforcement, now exposed by later brick-robbers, shows that it was applied internally to existing masonry; but the structure may have cracked or fallen in parts, since the material of the repairs appears in places to overlap the line of the original brickwork. The best visible example of this reinforcement is a pier and arch, inserted in the angle of the south vault, between the south-east and south-west arches of the preceding phase (pier IVa; Figs. 14 and 15, cross-section a-b). The pier is founded on mortared rubble, with a footing block of roughly dressed limestone 40 cm. in height. There follow seven courses of 'greenstone' (average height 30 cm.), and six courses of small limestone blocks (average height 13 cm.), carrying at the spring of the arch a single 'greenstone' levelling block 26 cm. high. The arch springing from this point to the south-east is of brick (average 6 cm. square by 4 cm.), with a diameter of 2·16 m. The pier is carried up a further 1·5 m. in coursed limestone (average height 20 cm.) to the spring of the new south-west arch, now almost completely destroyed. From the same point a relieving arch of brick follows the line of the lower, south-east arch, on which it partly rests; the space between them is filled with brickwork, banded with four courses of limestone. The upper edge of the relieving arch was shaved back to accommodate the profile of the new vault on this side. Similar measures were taken to reinforce the east vault, but the piers and arches are here rendered inaccessible by a slab of vaulting, springing from them, and now supported at its outer end only by earth and rubble, which it is consequently impossible to remove. This phase implies, at least in the area investigated, no departure from the basic plan initiated by its predecessor; and on the evidence it is difficult to say whether the original system was structurally unsound, or was damaged by earthquake, or whether the reinforcement of the substructures represents a rebuilding on a more grandiose scale above ground.

The final phase, V, consisted of the building of the Apsed Hall and its antechamber in great limestone blocks. It marks a great extension of the upper terrace, a further rise in level, and above all a change in the scale of operations which necessitated ruthless dismantling of earlier structures to make way for the massive foundations of the principal walls, although such fragments of earlier masonry as survived were utilized to support the vaulting beneath the floor. We have seen that the 'Triple Arch', after an earlier attempt to use existing foundations, was built on a new line which involved the suppression of the earlier vaults. Similarly, the great south-west wall, the full depth of which we exposed at its junction with the 'Triple Arch' (Pl. 10, B), cut through the south vault of the previous system, and the whole composite mass of earlier masonry was shaved back to the line of the latest pier and south-east arch. The footing of the new wall (Pl. 11, A) consisted of a raft of mortared rubble, set at a depth of *c*. 1·7 m. below the earlier foundations, and projecting some 1·9 m. from the face of the wall it supported. A break in the upper surface of the raft revealed a beam-hole running parallel to its outer edge at a distance of about 40 cm. from it; the wood, of which only an impression survived, may have served to retain shuttering for the lower part of the foundation trench. Directly on this raft was laid the first course of the massive limestone blocks of the south-west wall, consisting of nineteen courses with a total height of 9·52 m. Against the face of the wall, at a distance of 3·8 m. from the south-east face of the 'Triple Arch', was built a pier of twelve courses of limestone (total height 6·22 m.), topped by thirteen courses of brick (average 34 cm. square by 4 cm.; 10 courses to 99 cm.) to the spring of the arch connecting it along the wall face with the south-west pier of the 'Triple Arch' (Pl. 10, B). The voussoirs of this arch had fallen, and considerations of safety required the removal of the overlying brickwork (Pl. 10, A); when this was done, the topmost limestone course was revealed, and resting on it six courses of brickwork (average 34 cm. square by 4 cm.; 5 courses to 42 cm.), all that survived of the upper walls of the hall. The line of this upper wall was set back 8 cm. from the face of its stone foundation, and the presence of sockets for scaffolding inset in its base, and later masked by the brickwork of the substructures, suggests rather surprisingly that at least the lower parts of the walls on the 'piano nobile' were built before the completion of the vaults supporting the floor. All trace of these vaults had disappeared in the area of this trench, and later pillaging of materials had made it impossible to determine exactly how they were supported in the interior of the building, although a fragment of brickwork seated on the top of the earlier pier shows that it was re-used for this purpose.

The substructures of the Apsed Hall were also investigated along the line of the 1953 trench (Fig. 12 and Folder B). At the depth to which this trench was dug the central area yielded only collapsed vaulting; but towards the south-east end was found the upper part of the system of piers which once supported the floor immediately in front of the apse. These showed evidence of two successive phases of construction, which may have followed each other quite rapidly, since the brickwork of both is identical (average 33-35 cm. square by 3·5-5 cm., 5 courses to 47 cm.).

The first phase is represented by a pair of piers, 3·2 m. apart, placed symmetrically about the axis of the building just in front of the chord of the apse and carrying the remains of a system of longitudinal arches. These can be seen on the south-west pier, which is better preserved. There is a low and comparatively narrow arch on the south-east (Pl. 13, B) resting at its far end on a destroyed pier within the apse, and a higher arch of much greater span on the north-west, of which only the corbelled springing survives (Pl. 13, A, D). The upper arch indicates a floor-level at this point which must have been well over a metre higher than that of the surviving fragment of paving in the antechamber. The lower one belongs to a complex system of vaulting within the apse, (see also p. 44), which cannot usefully be discussed without further clearance.

This vaulting was subsequently reinforced by the insertion of four more piers, of which three are preserved, connected by arches and supporting a domical vault at a much lower level (Pl. 13, B, C). The structural sequence can be seen very clearly where the pier supporting the south corner of the domical vault abuts on the north-west face of the earlier pier, beneath the corbelled spring of the earlier arch (Pl. 13, D); the earlier brickwork had been pointed before the insertion of the lower, reinforcing arch. The technique of building and the dimensions of the masonry are identical in these two phases, except that, in the second phase, small levelling-blocks of limestone have been inserted at the spring of the arches to support the scaffolding used in their erection. For brick-stamps see No. 5, p. 108.

(3) THE SOUTH-EAST END OF THE APSED HALL (Pl. 14; Figs. 12 and 16-17). Exposed in 1953 by J. B. W. P. and D. O. Further examined in 1954 by D. O. and D. T. R.

That the great hall, the substructures of which have been described in the preceding sections, terminated in a semicircular apse was incontestably proved by excavation. In 1953 a trench beneath the existing terrace wall at the south-east end of the site, and some 5 m. south-west of the axis of the building, revealed the junction of the apse with the south-east wall of the hall (Figs. 12, Ib; Folder B). Three courses of limestone blocks were exposed, of which the middle course carried a simple bevelled cornice at a depth of 5·4 m. below datum. Elsewhere the masonry of the apse had been robbed to a depth greater than the safe limit of excavation, but its internal diameter could be calculated from the surviving curve as approximately 10.9 m. Accurate siting of the blocks in the course immediately above the cornice had been ensured by the use of wooden dovetail cramps in their upper surface, and the only surviving block of the next course above this was of 'greenstone'. As we have seen (p. 15), 'greenstone' was also employed in setting out the foundation course for the brickwork of the outer wall of the Peristyle; this does not necessarily imply that the two structures are contemporary, but it suggests that the precise line of the apse was determined from this level and that the structure above was at least partly of brick. The internal cornice probably served to carry scaffolding for its erection. It is impossible to determine exactly how the floor of the 'piano nobile' was supported,

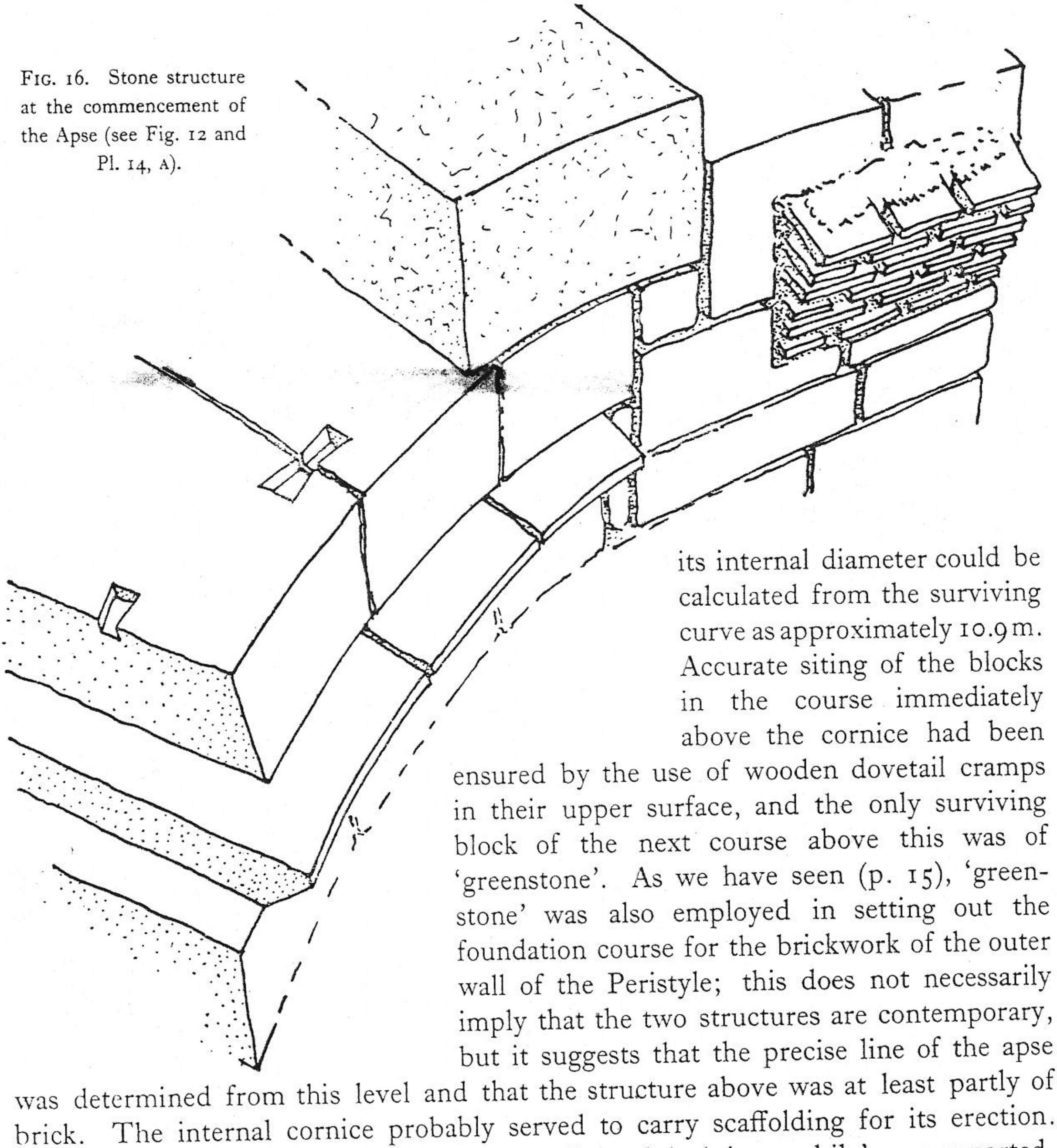


FIG. 16. Stone structure at the commencement of the Apse (see Fig. 12 and Pl. 14, A).

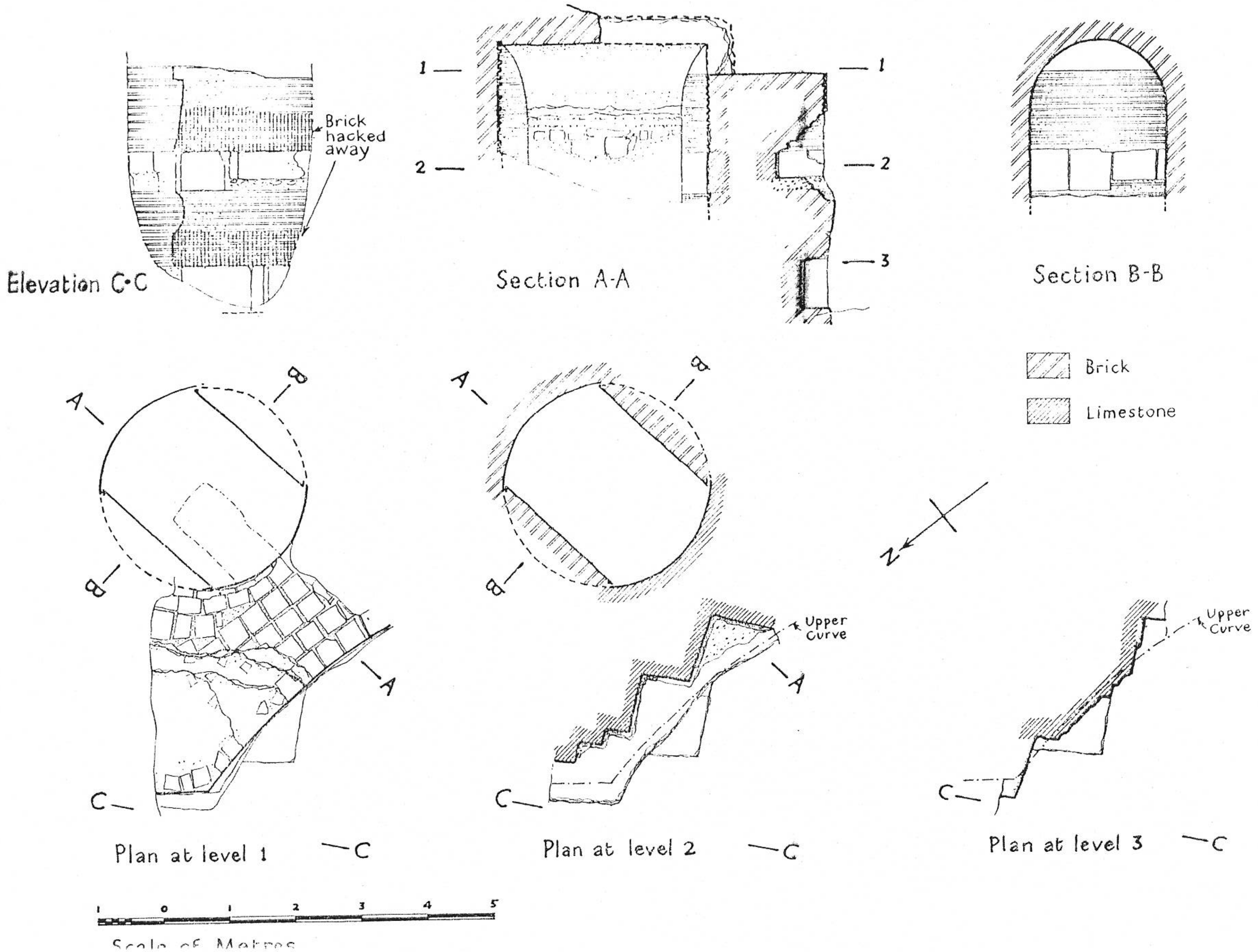
but the spring of an arch, grouted into the stone masonry at the south-west end of the chord of the apse, suggests a system of supports similar to those observed elsewhere in the building (Fig. 16).

A trench dug in 1954 to locate the return of the apse on the north-east revealed the reverse impression of the outer face of the robbed masonry on a composite brick and limestone structure which originally abutted on, and had at intervals been bonded into, the foundation of the hall. This consisted of single courses of large limestone blocks, varying from 40 to 60 cm. in height and liberally packed with pink mortar and fragments of stone, alternating with twelve courses of brick-work (height 1·15 m., bricks 37 cm.; Pl. 14, B; Fig. 17). Contained in the thickness of this structure was a round cistern, closed by a barrel-vault resting on parallel brick walls which filled two chords of the circle. The outer face of this mass of masonry was nowhere visible and its extent could not be determined, but the alignment of the limestone blocks shows that it formed part of a massive wall running south-eastwards from this point; in fact, that the new upper terrace, as defined by the substructures of the Apsed Hall and its adjoining cisterns, was on this side extended even beyond the line of the apse. The purpose of this extension lay outside the scope of our investigation.

It is necessary to mention at this point that the trenches across the line of the apse, and beneath the existing terrace wall, exposed middens containing kitchen refuse and glazed pottery which can be confidently dated to the twelfth century (p. 111). This demonstrates that the substructures of the Apsed Hall were being used as a dump for refuse by about A.D. 1150, and that the buildings above were certainly abandoned for ceremonial use by this date. The robbing of the masonry may possibly, and the construction of the existing terrace wall must certainly, be assigned to the Turkish period, even perhaps to as late as the building of the Sultan Ahmet mosque complex, which represents the first major re-use of the site, at the beginning of the seventeenth century.

(4) VAULTED CHAMBERS ADJOINING THE APSED HALL TO THE SOUTH-WEST (Pls. 14 and 15; Figs. 9 and 18; Folder C). First recorded by Mamboury-Wiegand, p. 34, pl. 89 ('Altbyzantinisch'); re-examined and surveyed in 1952 by D. T. R. and G. U. S. C. The central chamber was examined in greater detail in 1953 by J. B. W. P. and D. O.

Built up against the Apsed Hall and filling the angle between it and the south corner of the Peristyle is a group of three barrel-vaulted chambers. All three were


Elevation C·C
Brick hacked away
Section A-A
1
2
1
2
3
Section B-B
Brick
Limestone
A
B
A
B
A
B
B
A
N
Upper Curve
Upper Curve
C
C
C
C
C
C
Plan at level 1
Plan at level 2
Plan at level 3
1
0
1
2
3
4
5
Scale of Metres

found filled with rubble practically to vault height, but the central one has been partially cleared to foundation-level and can be described in detail. Its character and exact position can best be seen in the cross-section (Folder C).

It consists of a tall rectangular room, 5 m. long by 4·6 m. wide, and 8.3 m. from the crown of the vault to ground-level. The two side walls are built of brickwork, alternating with courses of dressed stone and resting on a footing of smaller coursed-stone masonry (the facing, presumably, of a mortared rubble core), which in one case rests in turn on a course of massive stone blocks. These side walls are built up against the outer face of the massive stone foundations of the Apsed Hall, which were certainly already in place when the side walls were built (Fig. 18). The room has been lengthened at a later date by cutting back the remaining south-west wall and adding a barrel vault on an axis which is off-centre to that of the main vault. Enough remains, however, of the original masonry to show that it had, when first built, a symmetrically placed arched entrance or opening, 2·3 m. across and of undetermined depth, high up in the south-west wall.

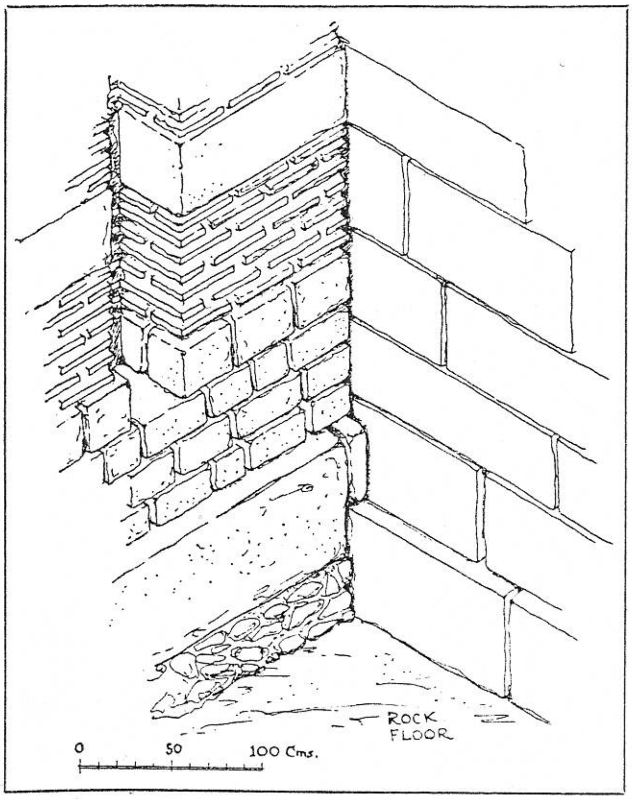


FIG. 18. Detail of masonry in chamber to south-west of the Apsed Hall (Mamboury, Dc.).

The character of the side wall is sufficiently indicated in the accompanying illustration (Pl. 15). The stone courses are of grey limestone, the brickwork widely jointed (5 courses to 47 cm.) and pointed horizontally with a broad 3-cm. groove, which is unusual in being flat rather than curved in section. In either wall there are two vertical slots, some 30 cm. wide and deep, which run straight up into the vault, to link up with terra-cotta ducts built into the thickness of the vaulting; and in the south-east wall, immediately below the springing-course of the vault, there is an arched opening, which gave access to the adjoining chamber (Pl. 15, B, C). At several points the stone courses can be seen to have been used to support scaffolding; and the topmost course serves also as a springing-course for the vault, which is built of bricks laid radially in the traditional manner, with a joint almost as wide as that of the walls below.

Of the end wall no less than sixteen courses are visible, resting on a single offset course, which in turn rested on bedrock. The hard pink mortar is laid to a thick, splayed joint and pointed with scored lines, and the limestone blocks, though carefully selected, can be seen to be re-used, since in several cases there are cramp-holes on what are now vertical faces.

The next chamber to the south-east (Fig. 9, II) is filled with debris practically to vault height, but except for the fact that it appears to have been longer (7·4 m.), it is of identical construction, with four identical slots in the side walls. It is possible that there was another chamber beyond this (Fig. 9, III), to which there was direct access from the substructures of the Apsed Hall, as there were traces of a vault on the wall between chambers II and III; the vault had, however, fallen. A fourth chamber on the opposite side of chamber I, and in the angle against the outer wall of the Peristyle, is also filled with debris (Fig. 9, IV). The proportions are rather different (6·3 × 3 m.), and there is an arched opening or entrance at the south-west end leading to a second chamber of similar shape beyond (Fig. 9, V). But a single vertical slot can be seen near the west corner, and there can be little doubt that both chambers are contemporary with the rest of the group. The difference in proportions is explained by the need to fit the chamber in between the Peristyle and a feature that is now accessible only from the substructures of the antechamber to the Apsed Hall. This consists of a tunnel-like passage (Fig. 9, VI) opening off room A (Fig. 10), through an arch in the stone foundations. This passage, which greatly perplexed us during excavation, proved on close examination to be the matrix of a wall of mortared rubble, 1·95 m. broad, which was still standing when the Apsed Hall and the adjacent vaulted chambers were built (see p. 28). The stone foundation of the Apsed Hall was arched across the line of it (presumably as a precaution against settlement) and the space to the south-west of the stone foundation, between and above the two immediately adjoining vaulted chambers, was filled with a mass of coarse mortared rubble. At some later date the masonry of the original wall was robbed out, perhaps by treasure-seekers, attracted by the seemingly blocked arch in the stone foundations, and the result of their work is the present blind passageway. Of the original character there can be no doubt, since the wall itself can be seen in section at the far end, and the impression of the neatly coursed facing-stones (5 courses to 80 cm.) is still clearly visible at several points in the mortar on either side of the 'passage'.

The robbing-out of the masonry of this wall has revealed two arched conduits, which crossed the line of the wall, immediately above it, incorporated in the mass of mortared rubble. One of these (42 cm. wide by 68 cm. high) runs along the outer face of the stone foundation and then branches off to discharge into the nearest of the vertical ducts in the central vaulted chamber. It is vaulted in brick, laid radially except for a single pitched brick at the crown of the vault, and there is a vertical shaft leading down into it from above, immediately to the right of the entrance to the robbed wall. The second and slightly larger conduit is accessible from the end of the robbed wall, running obliquely across it and then turning sharply south-westwards; it is blocked at either end. The vaulting is partly of pitched bricks and partly of bricks laid radially in alternate sections. These two conduits leave no doubt that the purpose for which this group of vaulted chambers was built was the storage of rain-water, for which, as we know from the incorporation of ducts at various other points in the building the builders made careful provision over the whole area. Whether in fact they were ever so used is another matter. No trace was found on the walls either of waterproofing or of the incrustation which standing water would have left, and it rather looks as if the original purpose was never put into effect.

At some later date these vaulted cisterns were filled practically to vault height with building rubbish (the debris, probably, from the demolition of a single building, since all the brick stamps found were of a single type, see p. 108, no. 4), and either on this or some later occasion the south-west walls were cut back to accommodate the north-east wall of a square vaulted structure with central pier (Fig. 1). The identification of this building with the substructures of the church of St. Elias put forward in the First Report (*G.P.*, p. 19) is untenable, since the surviving remains are manifestly of Turkish date. The masonry is typically Turkish, in the alternation of one course of brick with one of stone, in the inclusion of single bricks between the vertical joints of the stones, and in the nature of the mortar, which is sandier and contains less ground brick than Byzantine mortar. Moreover, the wall which forms the front of this building (Pl. 14, c) continues, at a higher level, across the substructures of the Apsed Hall, in places cutting through what had been the 'piano nobile'. The whole structure can, in fact, hardly be earlier than the late fifteenth century.[1]

What stood on this site before the erection of this structure in early Turkish

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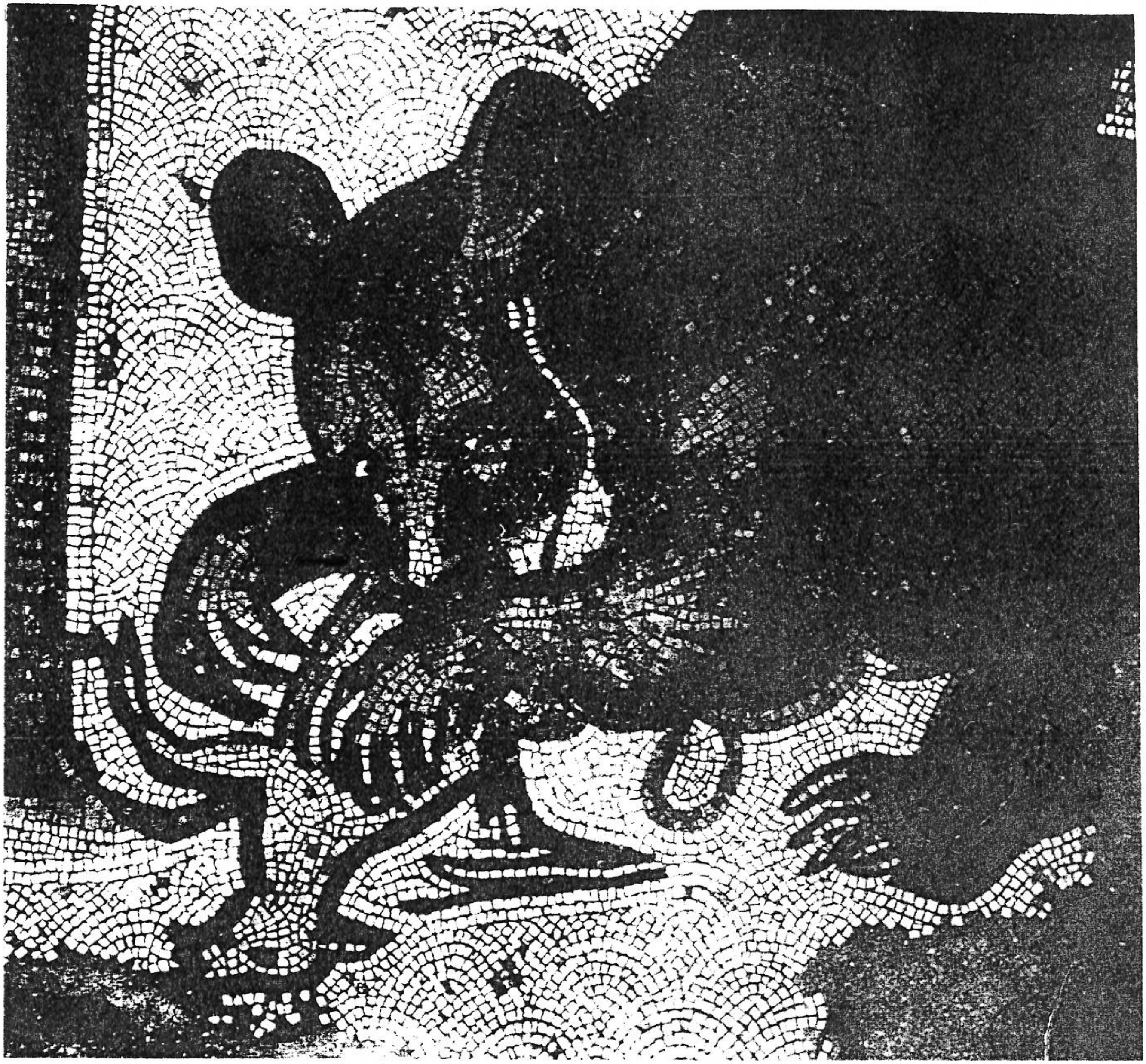
[1] Mamboury, who originally published this building, had himself accepted its Turkish date; see *Byzantion*, xiii, 1938, p. 304.



MOSAIC · BEAR DEVOURING A LAMB (No. 8)

times it is impossible to say. That there had been some considerable early building on the same site was shown by the discovery of a group of vaulted chambers or cisterns beneath the floor of the Turkish building and built on a different alignment (Fig. 1). All that can be said about them without prohibitively costly excavation is that they were built of rough stone masonry, set in a very hard mortar, the vaults being of one build with the side walls. Apart from their great depth, suggesting a relatively early date, no evidence of date was forthcoming; nor does their plan (which under present conditions can only be completed in part) make it possible to determine what sort of building originally stood above them.

A pottery drain-pipe leading down into one of these vaulted chambers from the Turkish structure above is a late addition; and two large storage jars, found below the floor of the Turkish building and above the upper face of the Byzantine vaults, may be of any date down to the mid nineteenth century.[1]

SUMMARY AND CONCLUSIONS

The results of the excavations described in the preceding pages afford the basis for at any rate a relative chronology of the principal structures disclosed.

The first substantial building on the site of the Apsed Hall appears to have been the 'greenstone' building, represented by two successive phases of building within the area subsequently occupied by the central and southern archways of the Triple Arch (pp. 32 and 37 f.). Whether the succession represents a substantial interval of time, or whether (as seems more probable) it represents no more than two successive stages of a single building operation, is not a question of great importance; in their completed form the two structures are manifestly complementary. The building to which they belong conformed with the orientation of the Palace and, on the evidence of the plaster surfaces, it appears to have marked the south-eastern limit of high-level building at this particular point. It can hardly have been other than the building to which the Paved Way gave access, and to which the central stone-built section of the outer wall of the south-east portico of the Peristyle (p. 21) also belongs. What form this building took, and what was its purpose, are questions that could only be determined by further, and very costly, excavations. Its existence, however, seems to be securely established.

The second major structural phase is represented by the pier and remains of vaulting found, built up against the original 'greenstone' features, within the excavation at the west angle of the Apsed Hall (p. 39 f.). This phase saw the enlargement of the original building towards the south-east and the substantial raising of a part at any rate of its floor-level. It lasted long enough for the new structures to have undergone massive repairs and reinforcement, as a result either of earthquake or of faulty building; but there is nothing to suggest that it was accompanied by any considerable structural changes within the area of the Peristyle.

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[1] Height, 94 cm.; diam. at shoulder, 75 cm., at mouth 35 cm. Two bands of applied cable-ornament at the shoulder.

The third and decisive phase is represented by the Apsed Hall. This involved a radical replanning of the buildings to the south-east of the Peristyle. Any walls that stood on the line of the massive stone foundations of the new building were demolished, and only those were spared that might serve to support the flooring within it. Although conclusive archaeological proof is lacking, there can be little reasonable doubt that these drastic alterations, which must in any case have involved the whole north-west façade of the building, were the occasion also of the replanning of its approaches and of the replacement of whatever buildings had accompanied the Paved Way by the four mosaic-paved porticoes of the Peristyle.

The subsequent history of the Peristyle has already been discussed (p. 23). Of any corresponding alterations that the Apsed Hall may have undergone, little or no trace survives. The wall and gutter of which traces were found running north-east and south-west across what had been the entrance from the portico into the antechamber (p. 34) survive to show that at some later date the two buildings were dissociated. But, for the rest, the almost total destruction of the Apsed Hall above floor-level has meant that any evidence of its later history has gone beyond recall.

The recent excavations have not thrown any fresh light on the structural relationship between the Apsed Hall and the cruciform building ('Mamboury Db'; *G.P.*, p. 19) which adjoins it to the north-east beyond the bare fact (attested both by the run of the terrace wall and by the logic of the Peristyle plan) that there was presumably already a building of some sort at this point. The excavations have, on the other hand, conclusively demonstrated that the corresponding building to the south-west ('Mamboury Dc') is of a far later date, and that it succeeds a group of early Byzantine vaulted structures that were themselves later than the Apsed Hall. Broadly speaking, one may say that, with the construction of the Peristyle and Apsed Hall, this end of the Palace reached its fullest extent. Odd buildings (such as the vaulted structures just mentioned) might be added against the face of the terrace, so that the seventeenth-century Turkish terrace-wall, which incorporates these added structures, came eventually to project a few yards beyond the line of its Byzantine predecessor. But the essential responsibility for establishing the present-day configuration of this end of the upper terrace rests with the builders of the Peristyle and Apsed Hall.

D. T. R.
J. B. W. P.
D. O.

CHAPTER III

NOTES ON THE STRUCTURE AND BUILDING METHODS OF EARLY BYZANTINE ARCHITECTURE

FROM the foregoing account of the excavation of a part of the Great Palace it will already have become evident that, although the remains exposed belong to several successive buildings and must, from first to last, cover a considerable period of time, there is no very great difference in structure and building technique between the earliest and the latest buildings represented. In this respect the Palace substructures are typical of the earliest Byzantine architecture in Constantinople. One of the principal difficulties that confronts the student of the architecture or topography of this period is that of distinguishing which of the city's many anonymous ruins are relevant to his studies. For this we must blame in the first instance the action of time, earthquake and fire, and the reforming zeal of later emperors, which have between them swept away the greater part of Constantine's city, and with it precisely those monuments which might best have served as a guide to the study of their lesser contemporaries. But an important contributory factor is undoubtedly the remarkable conservatism of Byzantine building techniques. There were, of course, gradual changes of fashion; and a sufficient number of datable buildings has survived to enable us to trace these developments in some detail during the Middle and Late Byzantine periods. But for the earliest phase we are almost entirely dependent on the *disjecta membra* of ancient buildings, which are all too often meaningless without the systematic exploration that so few of them have received.

These facts would seem to justify a discussion of the building techniques represented in the Palace excavations. For all their fragmentary nature, these lumps of masonry do represent a demonstrable succession of buildings, covering precisely the period for which we have least independent archaeological information. One cannot assume that they are typical; still less can one generalize on the basis of so small a body of evidence. Even so, as a body of carefully observed material, they have a certain value; and they will serve to call attention to some of the practical problems involved in the study of architecture in Constantinople between the time of Constantine and of Justinian.

Of the following sections, the first is a summary of the building materials and techniques represented in the Palace excavations; the second describes the materials and techniques used in a representative selection of contemporary buildings in Constantinople; the third discusses the antecedents of the building techniques described in the two previous sections; and the fourth comments on the position of the excavated Palace buildings within the historical sequence so revealed, and refers briefly to the significance of these techniques for the subsequent development of Byzantine architecture.[1]

(I) MATERIALS AND METHODS USED BY THE PALACE BUILDERS

Represented in the Palace excavations are examples of all the three principal building materials in common use in early Constantinople—dressed stone, brick, and mortared rubble. As we have seen in Chapter II, they were very often used simultaneously, the use of different materials corresponding to differences of function rather than of date. But since the methods of building involved in each case were different, and since they do also represent very different historical traditions, it is obviously convenient to discuss them separately.

(a) *Dressed Stone.* Two principal qualities may be distinguished, a grey tertiary limestone[2] and the stone which, for convenience of reference, we have followed the example of the previous excavators in calling 'greenstone'.

The grey limestone is a local stone. A very similar stone, used for the Theodosian walls, is said by Van Millingen to have been 'brought from the neighbourhood of Makrikeui, where the hollows and mounds formed in quarrying are still visible';[3] but it would need a detailed petrological study to determine more precisely the source of the various qualities of what was for several centuries the characteristic building stone of Constantinople. In a great many cases, as here, it was re-used from destroyed earlier buildings, and it was evidently an expensive material, to be used with economy and reserved for those parts of a building that called for special strength. In the wall dividing the Peristyle from the Apsed Hall we find it rather roughly dressed with a coarse punch (p. 21); in the perimeter wall of the Apsed Hall and in the transverse wall dividing the main hall from the antechamber it is more carefully finished, worked to an even surface with a fine punch (p. 26). In both cases the internal jointed faces are far less regular, and it follows the invariable Byzantine rule in being used with mortar, in this case a hard, pink mortar, liberally applied so as to fill up the intervening spaces. For extra strength, we find dovetail cramps (which must have been of wood) used in the footings of the apse (p. 43), which at this point served also as the outer wall of the upper terrace. The essentially utilitarian character of this limestone masonry is emphasized by the total lack of ornamental detail. The only features that relieve its severe simplicity are the plain bevelled mouldings at the spring of the arches, and these had a very practical purpose, that of supporting a temporary wooden framework during the construction of the arch itself.

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[1] The writer would like to acknowledge his deep sense of indebtedness to all those who have contributed to the writing of this chapter, both in the field and in discussion; in particular to Mr. Paul Underwood, Mr. Robert Van Nice and Mr. Cyril Mango for much valuable information based on their personal researches into Byzantine building methods elsewhere in the city; to Professor Paolo Verzone, who has undertaken valuable work of record in recent years, and who has kindly verified a number of doubtful prints; to Mr. Michael Gough and to Mr. Michael Ballance for information about outlying monuments; to Dr. F. W. Deichmann, whose book *Studien zur Architektur Konstantinopels* (Baden-Baden, 1956) covers much ground that is common to the present study but appeared too late for the present writer to be able to take full advantage of its author's deep practical knowledge of the monuments; to Dr. Rüstem Duyuran and Professor Arif Müfid Mansel for their invaluable kindness and helpfulness in connection with the writer's travels in Asia Minor; and to Mr. and Mrs. William S. MacDonald, without whose company those travels would have been far less pleasant and less profitable.

[2] Mr. Van Nice points out that the grey colour is an acquired characteristic, due to weathering. When first quarried the stone is a light cream or buff.

[3] A. Van Millingen, *Byzantine Constantinople*, London, 1899, p. 44; the modern Bakirköy.

The term 'greenstone' (*G.P.*, p. 2) is purely one of convenience, applied to a very distinctive green stone which is found in a certain number of early Byzantine buildings. It is in reality a sort of disintegrated granite, which comes presumably from the vicinity of Constantinople, although the exact location of the quarries does not seem to have been established. It is hard but rather coarse-grained, tends to scale off easily, and is of no use for fine detail. Instead, we find it used for the piers flanking the central arch in the phase preceding the Apsed Hall (p. 32); for the levelling-course of the Peristyle colonnades, where it was used with dovetail cramps to give added strength to the seatings of the individual columns (*G.P.*, p. 5); in the apse (p. 43), where the single course still in position rests directly on the limestone outer wall of the substructures, and may have served as a basis for a superstructure of brick, or possibly of brickwork alternating with 'greenstone' courses; and, used as a levelling-course, in the foundations of the west and north-west porticoes of the Peristyle (p. 15).

Dressed limestone was also used in horizontal courses alternating with bands of brickwork, or in isolated blocks that were intended to give special strength to such points as the springing of vaults. Good examples of the former can be seen in the vaulted chambers built against the south-west outer wall of the Apsed Hall (p. 46; Pl. 15; 'Mamboury-Wiegand Dc'; in this case the stone courses have been used to support scaffolding) and in the first-period pier exposed in the deep excavation at the west angle of the Apsed Hall; and of the latter in the substructures exposed on the axis of the Apsed Hall (p. 42), where the purpose of the inset stone is clearly that of providing a firm base for the centring used in the building of the arches supporting the vault. A rather special case is the pier supporting the west angle of the vault of chamber D (p. 31), built partly of brick, partly of rather small, coursed blocks of limestone. Like the somewhat comparable pier inserted to uphold the early vaulting in the deep excavation at the west angle of the Apsed Hall (p. 40), its character may be due to the re-use of earlier material.

Yet another use of dressed stone is in the form of small, roughly squared and coursed blocks, used as a facing for a wall of mortared rubble. Only two examples of this were found in the recent Palace excavations, the robbed wall which now figures as a tunnel opening off chamber A (p. 28) and, in a rough form, the Paved Way (p. 13).

(b) *Brickwork.* The brickwork of the Palace substructures is remarkably uniform, and is typical of early Byzantine brickwork elsewhere, with its large, rather carelessly shaped bricks, set in a mortar so liberally applied that it constitutes well over half the finished masonry mass. About the individual bricks there is little that can be said. The table of selected examples appended to this section suggests a slight diminution in size during the period represented, a tendency that has been observed on other sites;[1] but the considerable variation observable in the bricks of what appears to be a single batch, coupled with an increasing tendency to re-use earlier material, is a warning that this is evidence to be used with great caution. Many of the bricks are stamped (see p. 105 ff.); but, here too, without more material that is firmly dated, one can do little more than record the facts.

The mortar is pinkish or greyish white, and in almost all cases contains a high percentage of crushed brick, often in quite large nodules, together with small pebbles and other impurities that got into the mixture with the sand. A rather finer quality of mortar was used to finish the joints. In most cases the pointing has perished with exposure; but it survives in enough places to show that, whether intended to be seen or not, it consisted regularly of a shallow, continuous, horizontal grooving, giving a corrugated profile to the whole wall surface. These grooved joints were normally rounded in section, as if made with a rounded trowel or wooden spatula (Pl. 17, E); the tool used on the brickwork of the vaulted chambers built against the south wall of the Apsed Hall (p. 46) was unusual in being square-ended, 3 cm. in breadth. Only one example has come to light within the recent excavations of undercut jointing, (p. 21 f.); none of the setting of alternate courses back from the visible wall face and masking them with mortar, both of which are characteristic features of later Byzantine work (for the latter, cf. *G.P.*, p. 4).[1]

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[1] A. M. Schneider, *Byzanz* (Istanbuler Forschungen, 8), Berlin, 1936, pp. 813-14.

The following are some examples of the dimensions of the brickwork used in the Palace substructures :—

Early pier (Ib, of the phase preceeding the 'greenstone' piers) incorporated in the south-west pier of chamber D (p. 29).	Average, 38 cm. square by 4 cm.; 5 courses to 44 cm. Very white mortar, with little or no crushed brick.
Upper (original) arch between the two 'greenstone' piers IIb, IIc, in chamber D (p. 29).	Average, 36 cm. square by 4 cm. Mortar contains rather less crushed brick than the next example.
Lower (added) arch between the same two 'greenstone' piers in chamber D (p. 30).	Average, 34 cm. square by 4 cm. Crushed brick in mortar.
Walls of antechamber substructures (chambers A-D, Apsed Hall period).	Average, 33-34 cm. square by 4-4·5 cm.; 5 courses to 46-47 cm. Mortar greyish white, containing much crushed brick, some of it in quite large lumps.
Substructures on axis of Apsed Hall, earlier phase (p. 42).	33-35 cm. square by 3·5-5 cm. (a very irregular batch); 5 courses to 47 cm. Mortar containing large lumps of brick.
Substructures on axis of Apsed Hall, later phase (p. 42).	Indistinguishable from the preceding example.
Vaulted chambers added against the outer face of the south-west wall of the Apsed Hall (p. 46); later than Apsed Hall.	Average, 34 cm. square by 4 cm.; 5 courses to 46-47 cm.

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[1] A. M. Schneider and W. Karnapp, *Die Stadtmauer von Iznik* (Istanbuler Forschungen, 9), Baden-Baden, 1938, pp. 8-9.

(c) *Mortared Rubble*. The term 'mortared rubble' is here used in preference to 'concrete' or *opus caementicium*[1] since, despite a superficial resemblance to the concrete of Roman Italy (to which the term *opus caementicium* is usually applied), it lacks many of the essential properties of that unique building material. It consists normally of irregular blocks of stone or other building refuse, often of considerable size, roughly coursed and bedded in a mortar which may in exceptional cases be very hard (e.g. the second-period sea-wall at the 'House of Justinian', p. 170), but which is usually friable and quite easily broken up. It lacked the tensile strength and consistency of Roman concrete, and was rarely used as a material in its own right in cases where heavy loads or stresses were involved.

In the Palace we find two qualities in the Peristyle foundations, the one roughly coursed but not faced, used where the foundations were trench-built (Pl. 2, A, D), the other brought to a fairly regular face, used where they were built free-standing. The latter was not built to be seen (Pl. 4, A, right); its equivalent above ground is the facing of small squared blocks which we find used in the early wall exposed in section in the tunnel opening off chamber A of the antechamber substructures (p. 28). It is significant that, throughout the greater part of the length of the outer wall of the Peristyle, the mortared rubble footing was considered strong enough to carry the relatively light superstructure of the Peristyle; but that in the middle of the south-east outer wall of the Peristyle, where there was evidently a more substantial building to be carried, it gives place to cut stone. Elsewhere we find mortared rubble used as a filling above the vaulting in the antechamber, and again to fill the spaces above and between the vaulted chambers built against the south-west outer wall of the Apsed Hall. In both cases it is used as an inert, space-filling mass; it is the bricks that do the work. A special and distinctive type of building, in which bands of mortared rubble alternate with bands of brickwork, is represented in the earliest Sea Wall, exposed within the foundations of the 'House of Justinian' (p. 173).

(d) *Arches and Vaulting*. Except for a few instances where cut stone was used, the arches throughout the building were of brick, laid radially with the same liberal use of mortar as in the brickwork of the walls, and supplemented where necessary by one or more concentric outer rings. Most arches are approximately semicircular in shape, and only exceptionally do the builders seem to have felt any need for relieving arches.[1] They were, however, prepared to incorporate such features as the buttressing half-arch visible in the north-east face of the pier between chambers B and C of the antechamber substructures (p. 31); and internal features, such as a vault, might on occasion find visible expression externally, as higher up in the same face of the same pier (Pl. 4, B). A distinctive and characteristically Byzantine feature is the corbelling out of the lower courses of an otherwise ordinary, radial arch. Examples of this are to be seen in the early pier incorporated into the masonry that carries the vaulting of the antechamber substructures between chambers A and D (Pl. 8, C); and in the earlier of the two groups of substructures exposed on the axis of the Apsed Hall (Pl. 13, D).

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[1] In adopting this terminology I do not mean to suggest that a Roman engineer might not have used the term *opus caementicium* of Roman concrete and of mortared rubble alike.

Barrel vaulting constructed in the conventional manner, with bricks laid radially upon a timber framework, is used twice in the Palace substructures, and again in the large vaulted chambers built up against the outer south-west wall of the Apsed Hall (Pl. 15). The reason for its use here is probably that the span (between 4 and 5 m. in each case) was felt to be rather large for what was elsewhere the normal form of barrel vaulting, that with bricks laid on edge ('pitched') across the vault. The nature of this pitched-brick vaulting can most readily be comprehended by a glance at Plates 5 and 7. To build a vault of this sort it was first necessary to build the two end walls to their full height; the vault itself was then begun from both ends, each ring of bricks resting against its predecessor, and the outermost ring against the end wall; to complete the vault, the junction of the two halves was closed with an irregular wedge of whole or fragmentary bricks laid radially. The secret of building a vault of this sort is to use a mortar sufficiently quick-setting to hold the individual bricks in place until each ring is closed. Given such a mortar, it is theoretically possible to build it with all the rings vertical, but in practice it was found more convenient to slope some or all of them outwards from the centre, so that each successive ring was supported in part by its predecessor. It will be seen, for example, that in the vault of chamber D (Pl. 7, C, D), whereas the outermost ring at the right-hand end is built straight up against the vertical face of the supporting arch, at the left-hand end two small incomplete rings give a slight outward slope even to the outermost ring; and that in both cases the slope increases markedly towards the centre of the vault. This instance will serve also to illustrate what is a characteristic of this brickwork vaulting in all its forms, namely its flexibility and its freedom from hard-and-fast, formal rules. Pitched-brick vaults of this type were found not only in the antechamber substructures but also over the drains beneath the Peristyle

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[1] There is a relieving arch in chamber C beneath the Apsed Hall (p. 31).

(pp. 9, 10) and over the corridor in the earliest sea-wall beneath the 'House of Justinian' (p. 173). In the latter case the lower courses of the vault are corbelled out, and only the crown is pitched.

There are two examples of domical vault to be seen in the Palace excavations, one in chamber B of the antechamber substructures (p. 31; Pl. 7, B), the other in the second phase of the substructures exposed on the axis of the Apsed Hall (p. 42; Pl. 13). Like the preceding type of vault, it could be built without scaffolding or with a minimum of light movable scaffolding, each ring resting on its predecessor, until at the centre of the vault the whole was locked into position by a plug of bricks laid on end. It is noticeable that in chamber B the central part of the vault has fallen without notably affecting the stability of the rest.

The solitary surviving groined vault belongs to the earliest phase of the early structures exposed in the western angle of the Apsed Hall (p. 39; Pl. 12, B). It is very fragmentary, and can best be understood by comparison with such well-preserved examples as those in the narthex of the church of Saint Eirene (p. 73; Fig. 19). Like the two preceding types, it needed little or no scaffolding, being built from all four sides simultaneously; the outermost ring in each case rested on prepared seatings, and each successive ring rested on its predecessor and locked at either end into its two neighbours, forming a pair of diagonal groins, sharpest at the lower angles and gradually diminishing to a uniformly curved surface at the crown. Plate 20, A, illustrates the angle of such a vault; the steeply pitched bricks right in the angle rest on a miniature bracket of horizontal bricks corbelled out from the corner; the brickwork in the extreme left-hand upper corner is that of the upper wall-face of the angle, set back so as to accommodate the seatings of the vault and to take its outward thrust.

A marked characteristic of all this vaulting is the combination of extreme technical competence with an almost complete disregard for the niceties of finish. In this respect diagrams like those of Choisy,[1] suggesting that elaborate geometrical computation lay behind the eccentric curvatures of many of the early Byzantine vaults, are hopelessly misleading. The irregularities of such vaulting are due, not to any niceties of planning, but to their construction free-hand, or with a minimum of movable centring. The result may often appear careless and lacking in finish. But it is the carelessness of an assured craftsmanship, not of incompetence; and it was carefully reserved for those parts of a building which were not structurally important or which would not normally have been visible, either because of their

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[1] A. Choisy, *L'art de bâtir chez les Byzantins*, Paris, 1883, *passim*.

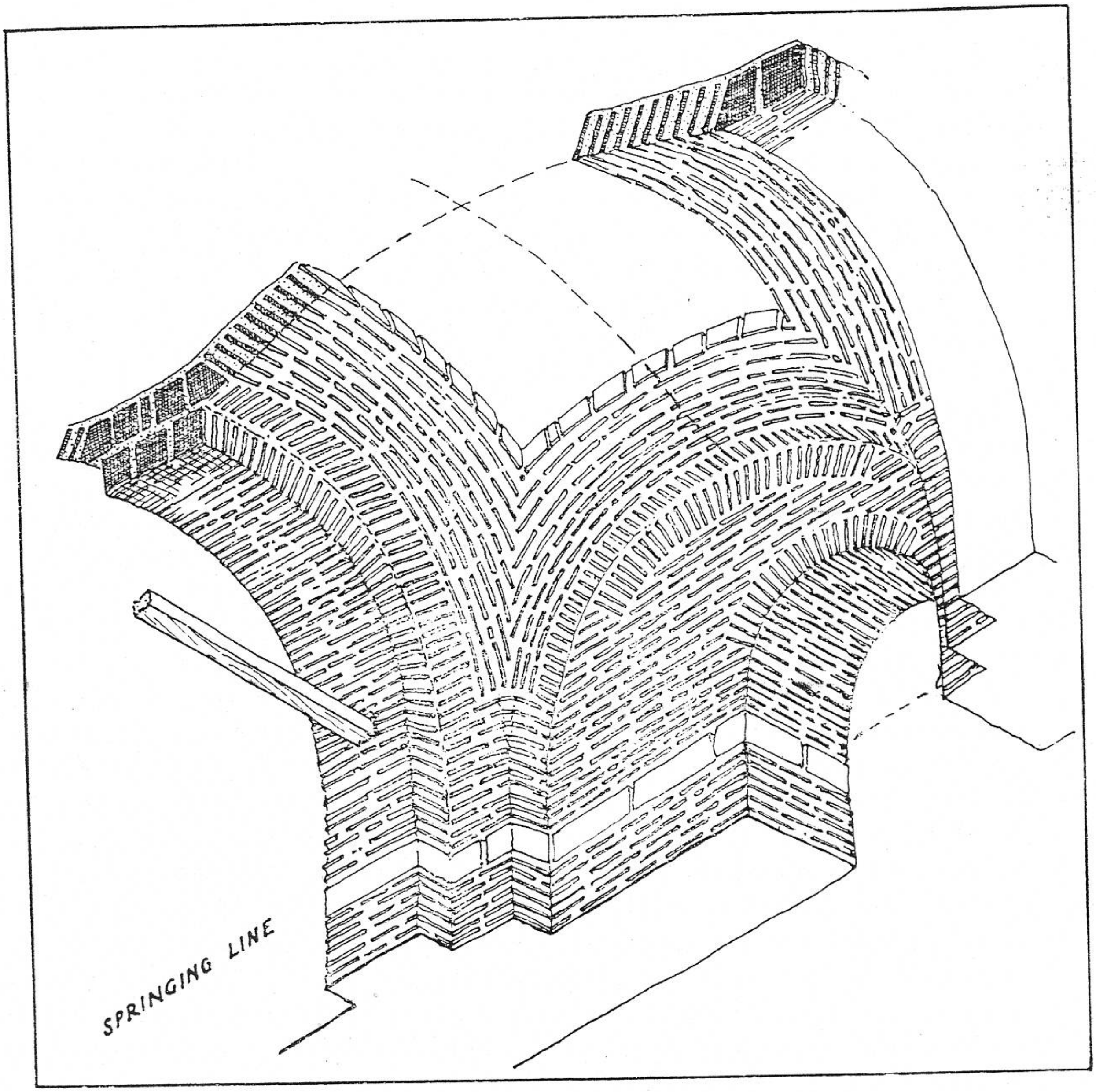
SPRINGING LINE

FIG. 19. Vault of the narthex in the Church of St. Eirene (after W. S. George, *The Church of St. Eirene*, fig. 17).

location or because they would be concealed behind a decorative surface of stucco or mosaic. The contrast revealed by the Palace foundations, between the scrupulous attention devoted to the layout and construction of the main load-bearing walls and the somewhat haphazard planning and execution of the vaulting that carried the floors, is typical of Byzantine building methods (cf. Hagia Sophia, p. 71). Economy of time and effort was evidently an important consideration. But there were also structural advantages to be gained. As is pointed out in a later section (p. 101 ff.) the range of vaulting that can be carried out in this sort of brickwork is strictly limited; within this range, however, pitched-brick vaulting offers a maximum of detailed variation and allows vaulting to be applied in circumstances that might well defeat the more conventional builder. The point has been well made by George in his description of St. Eirene.[1] Here, too, the Palace substructures are typical of Byzantine work.

(e) *Use of Timber*. The lower part of the foundations of the outer north-west wall of the Peristyle was trenched into loose, recently tipped earth (p. 7), and the trench had to be shuttered with a system of planks or shutters, which were held in place by short, squared, vertical timbers, themselves braced by similar cross-pieces. As in comparable Roman work, the timbering was left in place, and the impression of it is still clearly visible, stamped on the mortar of the footings (Pl. 2, A, B).

Scaffolding of some sort must have been used for building high walls; but there are no traces of vertical shuttering above ground, and the architects were evidently at great pains to keep the use of timber down to a minimum. With the exception of the arches, and of those barrel vaults that were built in the conventional manner with radially laid bricks, all of the vaulting could have been built using, at most, a movable wooden template and a movable platform to support the workmen. Odd holes here and there in the brickwork may have helped to support workmen's platforms, but the only traces of systematic scaffolding are in the traditionally barrel-vaulted chamber built against the south-west outer wall of the Apsed Hall, where the stone courses were used to carry temporary transverse timbers; the sockets visible on the inner faces of the 'greenstone' piers (Pl. 9, B, D) presumably served in the construction of a similar vault. Stone arches were regularly provided with a projecting moulding intended to support the wooden centring (p. 29; Pl. 6, B and 12), and examination of the spring of a brick arch will often reveal some feature (sockets, inset stones, or both) which served the same purpose.

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[1] W. S. George, *The Church of Saint Eirene at Constantinople*, Oxford University Press, 1912, pp. 37-8.

With the possible exception of the 'raft' for the stonework of the transverse wall (p. 41 and Pl. 11), no confirmation was found in the present excavations for the statement (*G.P.*, p. 4) that use was made in the Palace buildings of the system of strengthening mortared rubble foundations by incorporating a horizontal timber framework. On the whole it seems unlikely to have been used extensively, since it was essentially a method of stabilizing foundations laid in loose earth, and the Palace builders seem to have gone to great trouble in most places to reach a solid footing. The example illustrated by the previous excavators (*G.P.*, pl. 1, 4) is of Turkish date, and it may be that they were misled by the remains of the constructional shuttering described in the first paragraph of this section.

(f) *Cramps and Dowels.* Dovetail cramps were used in at least two places in the Palace substructures, in the 'greenstone' seatings for the columns of the Peristyle and in the footings for the apse of the Apsed Hall (Fig. 17). In the latter case certainly, and probably in both, they were of wood. There is no trace of the use of metal dowels, and in general these buildings exhibit an economy in the use of metal that is characteristic of Byzantine building methods.

(2) MATERIALS AND METHODS USED IN OTHER EARLY BUILDINGS IN CONSTANTINOPLE

To illustrate the remains described in the previous section, and to see them in their proper perspective, it will be helpful to pass in brief review the structural techniques employed in a few of the best-preserved of the other buildings that have survived from the first two centuries after the city's refoundation by Constantine. The list that follows is in no sense exhaustive. It is no more than a selection of those monuments that are readily accessible or have been well published, and in particular of those that seem to illustrate some particular aspect of the subject under discussion.

(a) *Early wall along the north-west side of Ankara Caddesi.* This is situated where the Ankara Caddesi joins the Divan Yolu, on the line of the ancient 'Mese', a short distance to the east of the column of Constantine. (Pl. 16, A, C).

The remains of a massive wall, over 1·5 m. in width, a stretch of which, running north-east and south-west for a distance of about 60 m., now forms the margin of the modern street. The exposed face has been cut back, and the north-west face is buried, and all that can now be seen is the core, consisting of alternate bands of rough mortared rubble and of brickwork.

The bricks (dark red, 37 cm. square by 4-4·5 cm., in extreme cases 3·5-5·5 cm.) are laid in bands of 5 (41 and 42 cm. high), and the rubblework (two successive tips, together 92 cm. high) consists of quite small fragments of limestone, laid haphazard in a hard white mortar containing a certain amount of crushed brick. The consistency of the mortar and the size and absence of coursing within the successive tips of the aggregate both resemble Roman concrete rather than the typical coursed rubblework of Byzantine practice, and there would seem to be some grounds for the suggestion that this may be a surviving stretch of the Severan city-wall. Alternatively, it might be a part of the buildings adjoining the Forum of Constantine. In any case it is certainly of early date.

(b) *The Hippodrome.* Begun by Septimius Severus and completed by Constantine, being sufficiently far advanced for its formal inauguration to take place on 11 May 330 (R. Janin, *Constantinople Byzantine*, Paris, 1950, pp. 22-3, 177-8).

What the Severan structure consisted of, and how much, if any, of it has survived, is not known. The excavations of 1927 included a section across the north-west longitudinal footings, and the excavators claim to have distinguished between possibly Severan and Constantinian levels (S. Casson in *Preliminary Report upon the excavations carried out in the Hippodrome of Constantinople in 1927*, p. 5); but no difference of structure is mentioned in the text, and the published section is far too small to be helpful. The upper parts of these footings are certainly Constantinian, and a photograph of these (*ibid.*, fig. 9) shows a massive wall of coursed rubble, brought to a rough vertical face and alternating with bands of brickwork, four bricks in each band, thick in proportion to their length and unusually closely set.

The recent excavations for the new Palace of Justice partially exposed a further section across the same side, some distance to the north-east. At this point the irregular mass of mortared rubble that supported the seating is intact, and at the outer end it rests against and is structurally secondary to a fragment of what must be the inner wall of the ambulatory corridor. This wall is 1·85 m. thick, built of mortared rubble alternating with bands of brickwork. The rubble is coursed, but the facing is surprisingly irregular and, even allowing for the decay of the surface mortar, can never have been meant to be seen. The bricks are dark red and average 30 cm. square by 5 cm., and they are, by Byzantine standards, rather closely laid (4 courses to 29 cm.; 5 courses and 4 joints, 34 cm.). The remaining visible structures of the ambulatory are later, but there seems no reason to doubt that this wall is a weathered version of that exposed in the excavations of 1927, and that both are of Constantinian date.

At the south-west or curved end of the Hippodrome, the *Sphendone* still towers above the slope to form the limit of the upper terrace of the Palace. It has been well described and illustrated by E. Mamboury and Th. Wiegand (pp. 40-1, pls. CIII-CV). The lower part is buried, but it has been ascertained at one point to rest on a projecting footing of large limestone blocks, 40 cm. high, on which rests a massive curved wall, which is built of alternate bands of brickwork (4-8 bricks in each band; individual bricks, 38-40 cm. square by 5 cm.; mortar joints 5-6 cm.) and of mortared rubble faced, at any rate on the exposed, outer face, with small squared blocks of limestone (5-10 courses in each band). The spacing of the bands of brickwork and stone is largely determined by the vertical spacing of the 25 great brick-framed windows of the *Sphendone* and of the smaller semi-domed niches over each arch, since practical and aesthetic considerations alike required that these should rest on, and the framing arches spring from, bands of brickwork. The authors rightly remark that where the facing is preserved the general effect is very like that of the Theodosian city-walls (cf. also the early sea-wall beneath the 'House of Justinian', p. 172).

The structures within the *Sphendone*, i.e. the ambulatory corridor and the wedge-shaped chambers beneath the seating, are vaulted with barrel vaults of brick, laid radially in the traditional manner (Mamboury-Wiegand, *op. cit.*, pl. CVI, *a*; cf. pl. CXI, in which can be seen the sockets for the centring used in building the vaults).

(c) *Hagia Sophia: the first church.* Dedicated in 360, seriously damaged in 404, restored and rededicated in 415, and finally burnt to the ground in the Nike riots of 15 January 532. The remains exposed in 1935 (A. M. Schneider, *Archäologischer Anzeiger*, 1935, cc. 305-11; *Byzantinische Zeitschrift*, xxxvi, 1936, pp. 77-85) include what can with reasonable certainty be identified as the northern part of the main west façade of the church, together with its monumental portico.

The façade wall consisted of alternate bands of brickwork and of mortared rubblework, faced with courses of small, very roughly squared stone. The surviving six courses of brickwork (individual bricks, 36·5-37·5 cm. square by 3·5-5 cm. thick, mainly 4 cm) measure 62 cm. (5 courses 49 cm.). The three very unequal courses of poorly squared blocks measure, with three joints, 4·8 cm. The mortar has crumbled badly on exposure, and the pointing, which no doubt concealed the very summary workmanship of the facing, is nowhere preserved (Pl. 17, D).

The portico is certainly the work of Theodosius II in the early fifth century. From the character of the brickwork it seems not unlikely that the surviving masonry of the façade is a part of the original fourth-century building.

(d) *Early buildings beside the 'Mese' at Beyazit.* Exposed in 1953 during building operations and summarily surveyed by D. O. and J. B. W. P. in collaboration with the Museum authorities.

The excavation revealed the remains of a massive platform, presumably that which carried buildings immediately adjoining the 'Mese' on its south side, where the natural line of the ground drops sharply southwards. The platform itself was of mortared rubble, faced with small flat stones (average, 4 courses to 45 cm.), on which stood a series of piers or bases, each consisting of a levelling course of limestone blocks, on which stood a square brickwork structure (bricks, 34 cm. square by 4-5·5 cm.; 5 courses to 46 cm.), with traces of a concrete floor-level against it, about 1·65 m. above the top of the platform. This building faced southwards across a street, and sealed below the street were the remains of an earlier building, laid out on the same orientation and consisting of a wall of rubble laid in a sandy, yellow mortar, 1·35 m. thick, and brought to a good face on the south side; the small square drainage-holes in this face suggests that it too had served as a terrace wall. The orientation presumably indicates a post-Constantinian date, when the line of the 'Mese' already existed in this quarter as that of a road leading up to the Constantinian walls, but before its incorporation within the city by Theodosius II and the monumental development of the area, here represented by the great terraced foundation.

(e) *The Aqueduct of Valens.* Built by Valens in 368 and many times damaged and repaired, but still one of the major landmarks of ancient Constantinople. This is one of the few monuments of early Constantinople of which there exists a detailed study (K. O. Dalman, *Der Valensaquäduct in Konstantinopel* (Istanbuler Forschungen, 3), 1933) (Pl. 17, A).

The lower tier of arches is built of grey limestone ashlar, set in a pinkish mortar. The individual blocks are relatively small (an average of 5 courses to 140 cm.) carefully dressed and coursed where exposed, but very irregular and liberally mortared in the interior. The facing-blocks were fastened with wooden dovetail cramps. The arches are turned in voussoirs (25-30 each) of the same limestone, cut with a curved extrados and with a keystone that projects both upwards and outwards. The only decorative feature is the simple bevelled moulding in the spring of the arch which, as in the Palace substructures, served to carry the centring during construction.

The upper tier is built of mortared rubble, faced with carefully coursed squared blocks of the same grey limestone (an average of 5 courses to 100 cm.) and strengthened at intervals of from 4 to 7 courses with courses of rather larger blocks, similar in scale and style to those of the lower tier and, like them, fastened with wooden cramps. It is not clear whether these strengthening courses run right through the pier (in which case they are the equivalent of the more familiar brick bounding-courses of ordinary Byzantine practice) or whether they are a purely superficial feature.

(f) *Building with mosaics, in the angle between Atatürk Boulevard and the road from Beyazit Square to the Adrianople Gate* (Edirnekapi). Probably part of a private house of the fourth or fifth century, which included a bath-building; found in 1953 during excavation for the foundations of the new Municipality buildings; the mosaics are now in the Museum. Seen by the writer in July 1954, when already partly removed.

Most of the visible walls are strongly but rather crudely built of mortared rubble brought to a roughly coursed face (individual courses from 20 to 35 cm. high), incorporating at two points good brick arches (bricks, 35 cm. square by 4 cm.). An octagonal room with semicircular niches in the angles is of finer workmanship, small blocks of squared limestone

(4 courses to 40 cm.), claw-dressed and smoothed over with a very hard mortar as a basis for marble veneer. A massive pier of rough limestone blocks appears to have been trenched into place to carry some more substructural superstructure. For the mosaic, see p. 66.

(g) *The Theodosian land-walls.* Built by Theodosius II *c.* 413, and furnished with an outer wall and ditch at some date before 440. Many times damaged and restored, but still retaining over the greater part of their length the essential physiognomy of the original work. The definitive account of the history and surviving remains is that in *Die Landmauer von Konstantinopel* (*Denkmäler Antiker Architektur*, vols. 6, 1938, by Fritz Krischen, and 8, 1943, by B. Meyer-Plath and A. M. Schneider); for an account of the structural techniques employed, see particularly vol. 2, p. 22 ff (Pls. 18 and 19).

The curtain wall consists of bands of brickwork alternating regularly with bands of coursed rubble, laid in thick mortar and brought to a face with courses of small squared stones. The individual bricks are a rich red and average 36 cm. square by 4 cm.; they are almost invariably laid in bands of 5 courses, with a wide horizontal mortar joint. The individual stone courses vary in height, normally between 10 and 15 cm., and there are on an average about 10 courses in each band. A typical section of the facing (just south of Topkapı) has 5 courses of brick (42 cm.) alternating with 10 courses of stone (1·5 m.). The core varies considerably from one stretch to another, but the normal practice seems to have been to distinguish between the part lying immediately behind the facing, which was solidly built of coursed and mortared rubble to a depth of 1-1·3 m., and the heart of the wall, which consisted of two or more fills of angular rubble, loosely tipped in between the two faces and sealed in place by the next band of brickwork. Very little mortar was used in this core, in many cases only a capping between one fill and the next (cf. Pls. 18, C, and 19, D).

With so many hands at work at the same time there was inevitably considerable variation of detail. Meyer-Plath (p. 23) notes that to the north of the Adrianople Gate (Edirnekapı) the stonework at times assumes more massive proportions (e.g. Tower 70; Meyer-Plath, pl. 23, *d*). Another and unusually elaborate version can be seen in the well-preserved stretch of walling immediately to the south of the Golden Gate (Pls. 18, A, B, and 19, C). At this point 5 courses of brickwork (45 cm.) alternate with 7 courses of masonry (1·17 m.); the blocks of the latter are rather larger, and are cut with greater care and laid to a finer joint than elsewhere, and the brick courses are pointed with a mortar that contains an unusually high percentage of crushed brick in order to accentuate the contrast between the two materials. At the other end of the scale, the masonry of the outwork, built within a decade or two of the main wall, is often extremely roughly finished and far more irregular in its alternation of brickwork and mortared rubble, the former sometimes being omitted altogether over stretches of several consecutive metres (*Die Stadtmauer*, ii, p. 24 and pl. 34). To complicate the picture still further, variants of the same masonry formula were used in successive repairs over a period of many centuries, partly it may be in a spirit of conservatism, and partly no doubt because much of the original material was normally available for re-use. A typical example of this can be seen in the extensive and well-documented repairs undertaken after the earthquake of 740 (Pl. 19, B).

The towers are vaulted internally at two levels and, so far as can be judged from the surviving remains, the individual building-gangs were allowed considerable latitude in their choice of the type of vault to be employed. Those of the surviving early Byzantine towers include both radially laid barrel vaults and barrel vaults of pitched brick, springing either directly from the two side walls or from a system of six internal piers, two in the middle of the two side walls and four at the corners, with barrel-vaulted recesses on either side between the piers; a similar arrangment of piers carrying three transverse arches and, between them, a pair of shallow, elongated, quasi-spherical vaults (constructed in much the same way as groined vaults, but concave at the point of springing at the four corners); and spherical vaults, which were a regular feature of the polygonal towers (in plan, half octagonal and half square) and which are found occasionally in the square towers. The earliest certain use of the spherical vault in a square tower is in Tower 16, which is ascribed to the repairs of 447 (Pl. 19, A); but, with this exception, Meyer-Plath claims (ii, p. 31) that all the forms of vaulting described above are to be found in towers that can be attributed to the original structure of the walls. The writer was not, in fact, able to locate any certainly Theodosian example of the vault with three transverse arches framing a pair of quasi-spherical vaults (the examples cited and illustrated in *Die Stadtmauer* all seem to be later—e.g. Tower 33, vol. i, pls. 8, *a* and 27, *a*; Tower 51=right-hand flanking tower of the Rhegium Gate (Mevlihanekapı), vol. i, pl. 10); but there is nothing inherently improbable in its use by the Theodosian builders. Certainly the form of tower with internal piers, affording as it did ready access to the embrasures, while at the same time strengthening the masonry mass at its weakest points, was found to be efficacious and was widely used in early repairs. Some of the best-preserved examples (with two transverse arches instead of three, and barrel vaults between them) come from the repairs carried out after the earthquake of 740 (e.g. Towers 18 and 19). The latter illustrate very clearly (Pl. 19, B) the common Byzantine practice of corbelling out the shoulders of a barrel vault in horizontal brickwork, leaving only the crown to be built with bricks laid radially over a wooden centring (cf. p. 58).

(h) *The Golden Gate.* From the essential structural unity of gate and flanking towers, it is quite certain that this was planned and built to serve as a ceremonial point of entry into the Theodosian circuit of walls, and not, as proposed by Strzygowski (*Jahrb. d. deutsch. arch. Inst.*, viii, 1893, pp. 1-39), as an independent triumphal arch, built by Theodosius I and incorporated into the walls by Theodosius II. It is surveyed and described in *Die Stadtmauer, etc.*, i, pp. 19-22; ii, pp. 39-62.

The original gate, which consists of two huge square towers flanking a triple entry, appears to have been built in part (the lower part of the flanking towers) of solid limestone blocks and in part (the upper part of the towers and the triple gateway) of mortared rubble, in both cases finished with a skin of finer masonry. Along the exposed outer faces this facing consists of a single thickness (0·95 m. deep) of blocks of Proconnesian marble; on the side facing the city and within the tower-chambers the facing is of limestone. The marble, which is used without dowels or cramps and is not even bonded into the core, is cut to a handsome isodomic finish, each block being 1·87 m. in length and laid exactly to the centre of the block beneath, so that the joints of alternate courses fall vertically, one above the other. The individual courses vary slightly in height, averaging about 40 cm. (e.g. the three courses immediately above the base-moulding of the north tower, which measure 41·5, 38 and 41·5 cm. respectively). To judge from the base-mouldings, which were left unfinished, the blocks were roughly punch-dressed when laid, and were finished in position, with a finely claw-dressed surface and a very narrow, chiselled drafting-line at the joints.

The surviving vaulting (visible, for example, within the north gateway) is of stone, with well-cut voussoir-blocks continuing the line of the arches visible in the marble facing over the three gateways. The stair-towers against the inner faces of the main towers are vaulted with pitched bricks in typically early Byzantine manner, but are not part of the original structure.

(i) *Cistern of Aetius.* R. Janin, *Constantinople Byzantine*, Paris, 1950, pp. 196-7. The Aetius in question is probably the city prefect of that name in 419, praetorian prefect in 425. He is said (Marcellinus, ed. Migne, *P.L.*, li, 924) to have built it in 421 (Pl. 16, B, D, E).

The walls of the huge open tank just inside the Adrianople Gate (Edirnekapı) are of coursed rubble, laced with bands of brick and faced with courses of small squared stones. The mortar is white with a little powdered brick. The bricks are unusually large (av. 40 cm. square by 4·5-5 cm. thick; medium-red colour) and carefully laid so that, in section through the wall, the joints of one course correspond with the middles of the bricks of the courses above and below; there are 4 courses in each band (ht. 41 cm.). The blocks of the facing average 12-13 cm. high, and there are 10 courses in each band (ht. 1·48 m.). The rubble of the core is of smaller chips of stone than usual, set in a generous bed of mortar and levelled off to correspond with every second course of the facing.

(j) *Church of St. Euphemia.* A. M. Schneider, *Archäologischer Anzeiger*, 1943, cc. 255-90; Rüstem Duyuran, 'First Report on Excavations on the site of the new Palace of Justice at Istanbul', *Annual of the Archaeological Museum of Istanbul*, 1952, pp. 33-8; *id.*, 'Second Report, etc.', *Annual*, etc., vi, 1954, pp. 11-17. Subsequent excavation has shown that the church, with its elaborately lobed hexagonal plan, is part of a far larger complex of similarly curvilinear structures, of which it appears to be an integral part. There are traces of a central fountain, later suppressed, and it seems probable that Schneider was right in maintaining that it was originally a secular building, later converted to Christian use, rather than that it was built as a church (so Grabar, *Martyrium*, i, p. 150). Schneider may well be right also in ascribing the construction of the building to the first half of the fifth century and its conversion into a church to the years immediately following the Council of Chalcedon in 451 (Pl. 21, A, B, C).

The masonry of the original structure is uniform: cut grey limestone for the lower part of the walls (except for the outer walls of the small circular chapels at the angles) and for such prominent features as the inner shoulders of the hexagon; and, on this basis, a superstructure of mortared rubble faced with courses of small squared blocks, alternating with bands of brick. The cut stone, though mortared, is carefully cut to courses of varying height (ranging from 34 to 45 cm.) and well jointed. The mortar of the superstructure is white with little crushed brick. The bricks of the facing are deep red; they measure 36-37 cm. square by 5 cm., and are laid 5 courses to 42 cm. The surviving complete band is of nine bricks (ht. 76 cm.). The squared blocks of the facing are rather larger than usual (ht. 20-25 cm), widely jointed and not very carefully dressed; one surviving complete band is of 4 blocks (ht. 94 cm.), another of 6. The joints are faced in finer mortar, those of the brickwork being smoothed to a continuous concave joint, running horizontally, those of the blocks (almost completely destroyed, but a fragment still visible in 1954 on the face of a wall striking off from, and of one build with, the outer face of the small circular room at the north-east angle) being smoothed over to a continuous face, covering blocks and joints alike, and then scored with double lines to mark both the horizontal and the vertical joints (cf. St. John of Stoudios, p. 71).

Almost certainly contemporary with the church-building and forming part of the same original complex are a quasi-semicircular entrance-portico, opening off the street that runs north-east and south-west between it and the Hippodrome, and, leading off the portico, a large circular hall with two doorways on the axis and eight large semicircular niches placed decagonally within it. The circular hall is built of good limestone masonry, claw-dressed and laid in mortar in courses averaging 32 cm. high (it was later turned into a water-tank); the walls of the portico are of mortared rubble faced with small squared blocks of stone, with brick quoins and possibly with brick bonding-courses. To a different and almost certainly later phase of the history of the site belongs a rectangular building, of which the most conspicuous feature is a pair of semicircular tower-like projections, built of brick alternating with courses of 'greenstone' blocks (bricks deep red, 3-5 cm. square by 4 cm., 5 courses to 43 cm., 13 courses between the two surviving 'greenstone' courses).

(k) *Martyrion of SS. Karpos and Papylos* (?). Identified as such and described by A. M. Schneider, *Byzanz* (Istanbuler Forschungen, 8), Berlin, 1936, pp. 1-4 (cf. *Archäologischer Anzeiger*, 1934, cc. 414-16). The identification, though not implausible, is not certain, and there is no clear evidence of date other than that afforded by the surviving structures.

These consist of the substructures of what appears to have been a circular church with internal colonnade and ambulatory, and a projecting apsed chancel. The central circular space is entirely occupied by a low spherical vault in brick (diameter 12 m., ht. 5·7 m.). The chancel and ambulatory have brick barrel vaults (the former with bricks laid radially, the latter with pitched bricks) and the walls are faced with bands of 5 brick-courses (ht. 50 cm.) alternate with 3 (ht. 82 cm.) or 4 courses of small, roughly squared blocks (Schneider, Abb. 1). The bricks average 37 cm. in length.

(l) *The Myrelaion Rotunda.* Beside the Myrelaion church (Bodrum Camii); excavated and published by D. Talbot Rice, 'Excavations at Bodrum Camii', *Byzantion*, viii, 1933, pp. 162-71; see also *Atti dell'VIII Congresso di Studi Bizantini*, ii, 1953, pp. 236-40. It was later converted into a vaulted cistern (Strzygowski and Forcheimer, *Die byzantinischen Wasserbehälter von Konstantinopel*, Vienna, 1893, no. 7, p. 59.

The exposed remains, which are difficult to see and are rapidly being destroyed, include a section of the outer face, composed of massive blocks of grey limestone, up to 1·3 m. in length. These are laid in unequal courses (up to 75 cm., average 40-50 cm.; individual blocks, 1·2-1·5 m. long), and at one point one of the courses is stepped. The superstructure may well have been of different materials, but the surviving remains on the north side (4 courses of brick, and 4 courses of rubble faced with irregular blocks) are presumably contemporary with its conversion into a vaulted cistern. Both the plan, which is rightly compared by Talbot Rice with that of the temple of Asklepios Soter at Pergamon (p. 89; in this case, however, we do not know what the entrance to the rotunda was like), and the materials suggest an early date—but not necessarily pre-Constantinian; cf. the niched stone rotunda recently excavated to the north of the Hippodrome, near the church of St. Euphemia (p. 69).

(m) *The church of St. John of Stoudios* (R. Janin, *Géographie écclesiatique de l'Empire byzantin, III*, i, *Constantinople: les églises et les monastères*, pp. 444-55). The most readily accessible account of the structure is that of A. van Millingen in *Byzantine Churches in Constantinople*, 1912, pp. 35-61. For more recent bibliography, see Schneider, *Byzanz* (Istanbuler Forschungen, 8), Berlin, 1936, p. 76 (Pls. 17, B, and 21, D, E).

The surviving masonry, except for the whole of the upper part of the apse and of the west wall above the built-in entablature corresponding to the lower order of the nave, appears to belong substantially to the original structure, built by the patrician Stoudios in 463. It consists of alternate bands of brickwork and of coursed rubble faced with small squared blocks of limestone, used with considerable freedom so as to make the most of the greater flexibility of the former in turning such features as doors and windows. The mortar is white with a small proportion of crushed brick. The bricks are 4 cm. thick, laid on an average of 5 courses to 43-44 cm. with a deep, rounded, concave joint. The limestone facing is variable. In the apse, except for a wide band of brickwork laid on a footing of larger stones immediately above pavement level (Pl. 21, D), 3 courses of stone (ht. 60 cm.) alternate with 5 courses of brick (ht. 43 cm.); the individual stones are jointed both vertically and horizontally with a well-marked groove. In the west wall the stones are larger (3 courses to 60 cm.) and less carefully shaped, being brought to a more or less level surface by means of a liberal spread of mortar, on the face of which are scored pairs of fine parallel lines, to represent the joints (Pl. 21, E; cf. St. Euphemia, p. 99). In both cases it may be noted that the pointing was a purely constructional finish, since it is clear from the setting of such built-in elements as window-frames and brackets that the wall surfaces were designed from the outset to be faced with marble slabs.

(n) *Hagia Sophia: Justinian's Church.* Began in 532 and dedicated in 536. All previous studies of the structure will be superseded by the detailed survey undertaken by the late William Emerson and Robert L. Van Nice, preliminary accounts of which have appeared in the *American Journal of Archaeology*, xlvii, 1943, pp. 403-36, and in *Archaeology*, iv, 1951, pp. 94-103 and 162-71 (for masonry techniques see, in particular, the first-named article, pp. 413-23, discussing the structure of the great south-east buttress; elaborated and in certain details modified in *Archaeology*, pp. 100-2). The following brief notes are based on these accounts, supplemented by inspection of the building under the guidance of Mr. Van Nice, whose work since the war, while substantially confirming the results already published, has greatly widened the scope of the enquiry.

The piers which carry the greater part of the direct weight of the superstructure are of limestone (*Archaeology*, 1951, pp. 100-1). So far as can be determined beneath the incrustation of marble, mosaic and whitewash, the essential structure of the rest of the church is of coursed brickwork, supplemented here and there by courses of stonework. The use of coursed rubble cannot be excluded, but in view of the heavy thrusts involved it seems very unlikely. Even as it is, the jointing is so wide that the proportion of mortar to brick in the total mass may be calculated as nearing 3:2. According to Van Nice (*A.J.A.*, p. 415), the earlier accounts of the substantial use of stonework in the walls (see E. H. Swift, *Hagia Sophia*, New York, 1950, p. 50, giving previous references) are exaggerated, although subsequent work shows that it was used to a greater extent than is allowed for in his own preliminary report. A good example can be seen within the passage that runs through the south-west buttress, where the original outer wall can be seen to rest on 15 courses of limestone masonry, above which are, successively, some 20 courses of brickwork, a single course of 'greenstone', another 20 courses of brickwork, and another of 'greenstone'. Similar courses of 'greenstone', 35-40 cm. in depth, were incorporated into the brickwork at a number of points to afford a firm seating for the brick vaults and for the scaffolding used in constructing the arches. In this particular case, the same two courses are visible also within the south-east buttress (*A.J.A.*, p. 416 and Fig. 7), the lower one forming the floor of the foot of the original stairwell, and the upper providing a springing course for the vaults of the south aisle.

The characteristics of this brickwork are as follows. The individual bricks vary in length between 35 and 38 cm. and in thickness between 4·5 and 6 cm. Ten courses measure on an average 96-97 cm., in extreme cases up to 1·04 m. The horizontal joints, which consist of finer mortar to a depth of up to 3 cm., are finished to a smooth, slightly concave section. Analysis of the structural mortar (*A.J.A.*, p. 418, n. 31) shows it to have been composed of lime, sand, marble dust and a certain amount of crushed brick and gravel. There is, inevitably, considerable variation in detail (some of the brick, for example, was evidently recovered from earlier buildings; and in an enterprise of this scale, undertaken in haste, one would hardly expect absolute uniformity between the work of different gangs of workmen); but the norm is constant, and can be readily distinguished from the repairs undertaken in later centuries.

The vaults are of brick throughout, characteristically and ingeniously varied to meet the particular requirements of the case. The four great arches that carry the dome are built of bricks of a size unknown elsewhere in Byzantine architecture (70 cm. square), and it is suggested that these bricks must have been specially imported from Rome (*Archaeology*, p. 102). The dome itself, skin and ribs together a mere 65 cm. in thickness,[1] is also of brick (the legend that these were especially light bricks has no foundation in fact), and springs from a marble cornice which serves precisely the same structural purpose as the stone courses incorporated elsewhere in the springing of the vaults (see above), that of providing a firm, rigid seating for the masonry of the actual cupola.[2] The pendentives, too, are of brick, and probably had originally a curved extrados.

About the other vaults in the main building we are less well informed; but Van Nice's observations are already sufficient to show that the architects were masters of their materials. They did, it is true, fail to allow for the flow of the mortar during the period following the completion of the building, and this, taken in conjunction with the outward settlement of both piers and buttresses as a result of the compression of the rock on which they were founded, was one of the reasons why the first dome fell, barely twenty years after it was built. But, with this exception, they seem to have shown an extraordinary mastery of the refinements of structural technique required for economical and efficient building.

The same qualities of economical efficiency are apparent in the vaulting of such secondary structures as the buttresses. Here there was no need for refinement, only for rapid, competent construction, and the whole range of Byzantine vaulting techniques could be pressed into service as required, without thought of consistency or finish—groined vaults, built up course by course, as in the example illustrated from St. Eirene (Fig. 19); half-arches and segmental arches; barrel vaults of pitched brick, with the lower courses either corbelled out or laid radially as in the traditional barrel vault, and incorporating as needed a framework of radially laid arches. It was the flexibility of this type of vaulting that made it so valuable (e.g. the groined vaults of the passage-way incorporated within the south-western buttress, which are fitted to an elongated rectangular plan by the simple expedient of closing the vault with a narrow panel of pitched bricks laid in herring-bone pattern); and we can hardly doubt that extensive use was made of it also in the secondary structures of the main building, as, for example, in the aisles, where it would have served admirably to resolve the awkward vaulting problems occasioned by the exedrae of the central nave.

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[1] 80 cm. at the lowest measurable point, above the crown of the window arches, gradually diminishing upwards towards the point where the ribs are merged within the web, where the total thickness is about 65 cm.

[2] The functional character of the cornice is confirmed by the fact that it is tilted inwards at 9 degrees to the horizontal.

(o) *The church of St. Eirene.* Built by Justinian to replace an earlier church destroyed in the Nike riots of 532. Although the main lines of the building are almost certainly those of the original Justinianic church, the atrium and part of the narthex are known to have been destroyed or very severely damaged by fire in 564; and the building as a whole suffered further damage in the great earthquake of 740. For a detailed survey of the building, as visible in 1909, see W. S. George, *The Church of Saint Eirene at Constantinople*, 1912. Certain features of his account require modification or amplification in the light of subsequent knowledge (e.g. the present columns of the nave arcades can now be seen to be a clumsy replacement, dating no doubt from Turkish times; and it is now certain, as George himself surmised, that similar arcades separated the body of the nave from the galleries above, on either side of the main dome); but in the main his conclusions seem to be well founded, at any rate so far as concerns the successive modifications undergone by the western part of the church, the narthex and the atrium (Pl. 20, A).

The lower part of the outer walls of the church, to the level of the springing of the vaulting, and the main piers of the nave up to the gallery string-course are of limestone masonry, rather roughly dressed and laid in a hard, pinkish mortar, in courses averaging 60-70 cm. in height. The vaulting and presumably the upper parts of the walls were of brick; what part, if any, of the visible exterior superstructure, in alternate bands of brickwork and of courses of mortared rubble faced with small squared blocks of stone, belongs to this first phase is not at all clear. Certainly a very substantial part of it must belong to the later (eighth-century?) restorations.

The narthex, the first bay of the south aisle of the church, and the nucleus of the present atrium comprise a well-defined structural unit, which can be attributed with reasonable certainty to the repairs undertaken after the fire of 564. The most distinctive characteristic of this work is the liberal use of 'greenstone'. Thus the south-west corner-pier of the original atrium is built entirely of this stone, and the intermediate piers of the north and south atrium arcades (so far as they are still visible) are built of single courses of the same stone alternate with 20 courses of brickwork (cf. the north-south corridor in the excavated area to the south of the church, p. 74). So, too, at gallery-level, the pier at the south-west corner of the first bay of the nave (i.e. at the junction of the west and south galleries) can be seen to be built entirely of 'greenstone', except for its south-east corner, which was presumably added when the vaults of the south gallery were built; and the lower part of both the west and south walls of the narthex include courses of the same stone, incorporated in the brickwork at irregular intervals.

The vaults are well and lucidly described by George (*op. cit.*, pp. 34-46). Of those now visible, the only ones that can certainly be attributed to the sixth century are the groined vaults of the present narthex (fig. 19, Pl. 20, A), which are typical of this form of vault as built without centring by the early Byzantine architects (cf. p. 59). The vaulting of the north and south aisles (except for the westernmost bay in each case, which belongs to the narthex system) is an ingenious adaptation of the pitched-brick barrel vault (*ibid.*, pp. 39-41), and is certainly later (eighth century?), as is the no less ingenious quasi-domical vault covering the elongated western bay of the nave (*ibid.*, pp. 41-3). There is no evidence to indicate the date of the more conventional domical vault over the small square rooms at the north-east and south-east corners of the original building; the rooms themselves are a part of the original plan.

(p) *Excavated buildings adjoining the church of St. Eirene.* They stand on the south side of the narthex and atrium, towards Hagia Sophia. Visited by courtesy of the excavator and former curator, Dr. Ramazanoglu, who has kindly authorized the publication of the following brief notes. For a summary interim account of these excavations see E. Mamboury, *Byzantion*, xxi, 1951, p. 438 (Pls. 17, C, and 20).

The structures exposed comprise a long, vaulted corridor running east and west along the south wall of the church and atrium; joining it at right angles from the south, approximately on the line of the west wall of the church, a second corridor; in the angle between the two corridors, towards the east, a massive vaulted ramp and, adjoining it to the south (a later addition, replacing some destroyed earlier feature), a cistern; and, occupying the whole of the excavated area within the corresponding angle to the west (i.e. approximately on the line with the atrium of the church), a monumental courtyard, running north and south, and flanked on either side by arcades of brickwork which lead up to a portico of marble columns across the north end; a door in the middle of this marble corridor opens into the main east-west corridor. This layout appears to incorporate, or at any rate to be dependent on, certain earlier features (it is very noticeable that the plan is not organically conceived in relation to the church of St. Eirene); it later underwent substantial modification, e.g. the insertion of a second vaulted cistern in the middle of the east portico, and (almost certainly secondary to the original structure) the building of an elaborate nymphaeum-chamber within the north-east angle.

In the north-south corridor the most striking early feature is a series of robust square piers, one of them built entirely of 'greenstone' blocks, the others of brick alternating with 'greenstone'. Plate 20, D, illustrates two of these piers in the west wall of the corridor, in the left-hand one of which the 'greenstone' alternates with 20 courses of brick; the masonry visible between the two piers is later. Another early feature is the ramp, which clearly belongs to the original layout and perhaps gave access to the gallery of the church. The masonry of this ramp is very varied: the two end walls, including the entrance from the corridor, are of cut grey limestone in courses of 35-45 cm. (Pl. 17, C); the upper part of the northern flanking wall (that on the south is later) consists of a facing of small, coursed blocks, alternating with bands of brickwork (5 courses); the lower part of the same wall is similar but of larger blocks and more coarsely built; and the ramp itself was carried on a series of gently sloping barrel vaults of pitched brick, supported at regular intervals by transverse arches of brickwork (Pl. 20, E.).

The same use of cut stone (mainly 'greenstone') is characteristic also of the original work in the courtyard to the west of the north-south corridor. Plate 20, C, illustrates the north wall of the marble portico (i.e. the party wall between the portico and the corridor) at a point immediately to the left (west) of the central door leading from the portico into the corridor. In it can be seen the characteristic brickwork (bricks, average 4 cm. thick, 5 courses to

44-45 cm.); a course of 'greenstone' blocks at the springing line of a small, brick-arched doorway on the left; above this stone-course, on the extreme right, the scar of the transverse (north-south) brick arch flanking the main doorway, which was of 'greenstone' blocks (at this point robbed to below the level shown in the photograph, and represented by a vertical break in the masonry); and, to the left of this, the steeply sloping springing-courses of a bay of groined brickwork vaulting. To the left of this again, over the small door, there appear to have been some other transverse vaulting features; the wall on the extreme left is a later addition; and below the 'greenstone' course can be seen the marble pegs for fastening into place the cramps to hold the marble slabs with which the walls of the portico were faced. The vaulting of the east-west corridor (Pl. 20, B) appears to have resembled that of the marble portico.

These examples will serve to illustrate the various types of masonry attributable to the main building period. Pending full publication, this cannot be dated with certainty. It may perhaps be ascribed to the earlier part of the reign of Justinian, when the whole of this quarter was remodelled. Alternatively, it may belong to the period following the fire of 564 and be contemporary with the rebuilding of the atrium and narthex of the adjoining church. Either date would accord with the character of the surviving capitals and transennae of the marble portico.

The immediate impression left by the foregoing survey is that of the extraordinary conservatism of Byzantine practice, even during the formative years that followed the city's first establishment. In such a conservative atmosphere, radical changes of method and clear-cut lines of division are not to be expected. Certain broad tendencies do, however, seem to emerge, and one may venture to summarize them as they appear to take shape from the available evidence. But any such summary must be read with the reservations expressed at the beginning of this chapter very clearly in mind.

Cut stone was in limited use throughout the period from Constantine to Justinian. As a material to be used in isolation, as in the Aqueduct of Valens or in parts of the early sea-wall (Mamboury-Wiegand, pp. 1-3), it appears at all times to have been exceptional; but it was far more widely used in conjunction with other materials than is commonly supposed. Right through the period under consideration we find it used in solid masses for terraced foundations or piers that were called on to carry specially heavy loads, and in isolated courses or blocks to provide a firm seating for a vault or to support a heavy scaffolding; and if available, it might even serve for such a feature as the entrance to the staircase-ramp beside the church of St. Eirene (Pl. 20, D). But the way it is used in the Golden Gate reminds us how far Byzantine practice had moved from the Hellenistic traditions of fine ashlar masonry: cut stone was an expensive material, to be used when needed, but to be used sparingly.

It may well be that further research will reveal how far fine ashlar was still being quarried, and how far the Constantinopolitan builders were dependent on re-used material.[1] On the evidence available, there would seem to be good reason to believe that one quality of stone at any rate, the 'greenstone' (see p. 54), was specially quarried, and that it was quarried over a relatively short period of time. The examples known to the writer to which an approximate date can be assigned are all Justinianic.[2] One would certainly hesitate to exclude the later fifth century, from which so few datable monuments survive; on the other hand, the fact that it does not seem to have been employed by the builders of the Theodosian land-walls or in other monuments of the first half of the century is negative evidence of some weight. The earliest recorded use seems to be in the earliest building period of the substructures beneath the Apsed Hall (pp. 38, 39); and on the present evidence it may be said to have come into general use after the middle of the fifth century and to have been still readily available after the fire of 564.

In brickwork there seems to have been a fairly consistent tendency for the size of the individual bricks to get less, from an average of 39 cm. square in the *Sphendone* down to an average range of 34 to 38 cm. in Justinian's buildings, of which, allowing for the considerable re-use of earlier material, we may probably regard the lower figure as a better index of contemporary practice. Such as it is, the evidence of the Palace substructures (p. 56) confirms the existence of such a trend. The employment in the Hippodrome of a quite different size of brick, 30 cm. square, may well be an isolated survival from the previous period (see pp. 96-101). On the other hand, the builders of the cistern of Aetius were still using bricks 40 cm. square at a time when (if the cistern is rightly dated) the builders of the adjoining land-walls were already using bricks of 36 or 37 cm.; we are reminded how carefully such a criterion has to be used in trying to date any individual monument.

Side by side with this tendency to reduce the size of the individual bricks there was a marked tendency to increase the proportion of mortar to brick, resulting in the use of an increasingly wide horizontal joint. In its later manifestations this resulted in all sorts of devices for elaborating the decorative effect of the jointing, but these are all later than the period under review.[1] The standard form of pointing remained that illustrated in Pl. 17, E, the only chronological difference being that on an average the horizontal jointing gets progressively wider, from a proportion of 1:1 (or even less) in the fourth century, up to 4:5 or even 2:3 in the sixth.

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[1] A well-attested example of such re-use is that of the stone from the walls of Chalcedon (destroyed because of that city's part in the rising of Procopius), which was used to build a bath-building (lavacrum, δημόσιον λοτρόν), probably the *Thermae Carosianae*, which were dedicated in 375 (*Amm. Marc.*, xxxi, 1, 4; Socrates, *Eccl. Hist.*, iv. 8).

[2] E.g. in the churches of Hagia Sophia and St. Eirene, in the excavations beside St. Eirene, and in the later (sixth-century?) buildings adjoining St. Euphemia. According to Van Nice there are, however, at least two examples that may be pre-Justinianic, in the south-west corner surrounding the Horologion, and incorporated in the north-west buttress. An additional example, from its alignment probably also pre-Justinianic, was found by Bay Ramazanoglu below floor level outside the middle door of the north aisle. A fine example that is not dated is to be seen in a massive retaining-wall beside the railway between the 'House of Justinian' and the church of SS. Sergius and Bacchus.

Mortared rubble is, from its very nature, a medium about which it is hard to generalize. It is tempting to regard those examples of it that approach most closely to Roman concrete (e.g. the wall of Ankara Caddesi or the cistern of Aetius) as early, or at any rate as survivals of an early tradition. But there is not enough evidence on which to generalize, and the example of the second sea-wall at the 'House of Justinian' reminds us that function as well as tradition played an important part in determining the selection and use of materials. What does seem to be reasonably established is that the particular sort of mortared rubblework that we find in the Theodosian walls was already well established in the time of Constantine and was obsolescent by the sixth century. In particular circumstance it might be revived later on, as in the repairs to the land-walls after the earthquake of 740 (see p. 67). But the very limited use made by Justinian's architects of what had been such a common building technique may reasonably be taken to mean that by their time it was no longer a part of everyday building practice.

(3) THE HISTORICAL BACKGROUND

It remains to examine briefly whence these building practices were derived, and what place they occupy in the history of the development of Late Antique architecture. The enquiry is a pertinent one, since it has at various times been the subject of a number of conflicting assertions, most of them intended to bolster this or that theory of the origins of Byzantine architecture; and although the question of Byzantine origins is one that lies outside the scope of the present report, only by re-examining the evidence of comparable monuments during the immediately preceding period can one hope to view the remains of the Palace, and of other contemporary buildings in Constantinople, unimpeded by the distorting shadows cast by such preconceived theories of historical development.

The tendency in recent decades has been to emphasize the importance of Rome for the genesis of a specifically Byzantine style. This tendency is due partly to a reaction against the extreme 'orientalist' view fashionable in the twenties and thirties, and partly to an increasing realization of the significance of the architectural revolution that took place in Rome during the first two centuries of our era.[1] In this latter connection students have been mainly concerned with tracing the development of certain specific architectural forms and ideas about the handling of interior space, and only to a lesser extent with questions of materials and building techniques. But it is often implied, and sometimes stated, that because early Byzantine architecture embodies important features of planning that can reasonably be held to have been developed first in Rome, the methods of building, too, must be derived from the Roman building practices to which they bear a superficial resemblance.[2]

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[1] E.g. those illustrated by A. M. Schneider and W. Karnapp in *Die Stadtmauer von Iznik* (*Nicaea*) (Istanbuler Forschungen, 9), Baden-Baden, 1938, Abb. 1.

Any such assumption is, of course, profoundly misleading. A building like the 'House of Justinian' does bear a familiar likeness to, for example, a typical arcaded building in Roman Ostia. But the resemblance is only skin-deep. Both are faced in brick; but whereas the Byzantine building is constructed throughout of bricks and mortar, its Roman counterpart is essentially a concrete structure. Roman concrete, it is true, was nearly always faced in other materials, of which by far the commonest under the later Empire was brick. But one can quarry away every stone or brick of the facing and the building will still stand; the essential structure is the core behind the facing, and that core is of good stout Roman concrete.

What were the characteristics of this concrete, as used in Rome during the first three centuries of our era? The first and most obvious is that, thanks to the properties of the local materials, and in particular of the dark volcanic sand, *pozzolana*, it is immensely tough. It was the strength of their concrete, and this fact alone, that enabled Roman architects to achieve the revolution in architectural thought that took place under the Early Empire.[3] The triumphs of Greek architecture had been achieved despite, or perhaps because of, the limitations of the traditional materials in which the Greeks worked. Its effects were achieved by its rationality and by the subtle balance of its visible components, and one might not unreasonably say that Greek architects were happiest when they were dealing with a building that was to be looked at rather than lived in. It was left to the architects of the seventy-odd years from Nero to Hadrian to evolve the modern concept of architecture, not as the marshalling of masonry masses but as the organization of interior space. That was the concept of architecture which dominated contemporary architectural thought throughout the later part of the Roman Age, whether it be in the extravaganzas of Hadrian's Villa or in the grandiose vistas of the great Imperial bath-buildings—or in the soaring perspectives of Hagia Sophia, which, in this respect at any rate, is surely to be regarded as an essentially Roman building.

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[1] See the writer's 'The Italian Element in Late Roman and Early Medieval Architecture', *Proc. Brit. Acad.*, xxxiii, 1947, pp. 163-94.

[2] An extreme statement of this view will be found in E. H. Swift, *Roman Sources of Christian Art*, New York, 1951.

[3] It is, incidentally, probably one of the reasons why so much more of ancient Rome is preserved than of ancient Constantinople.

Another, and from the point of view of building methods extremely important, characteristic of this concrete was that it took a long time to dry out. This was not only a vital factor in determining the hardness of the finished product; it also had an important bearing on the way Roman builders set about their work. Even when the mixture has been tipped into a boarded trench (as one can see very well, for example, in the foundations of the Arch of Titus, Pl. 22, A, composed of alternate layers of *selce* and of travertine) the aggregate is nearly always stratified in horizontal levels, showing that it was tipped into the trench layer by layer. But the layers are not structurally distinct. The mortar dried slowly enough to be able to incorporate each successive layer as it was added, and to unite the whole into a single homogeneous mass. The structural unit is not the individual layer, but the mass as a whole.

What is true of foundations is true also of walling built above ground. Here Roman architects took advantage of the properties of their material to reduce timber scaffolding to a minimum. One can see this very clearly, for example, in a building like the late-Republican tomb of Caecilia Metella beside the Via Appia, the concrete core of which was originally faced with travertine blocks (Pl. 22, B; the blocks visible in the photograph served to bond the facing into the core). In a building of this sort the concrete was built up layer by layer, using a single course (or occasionally two or more courses) of the facing as a framework. At intervals work had to be suspended in order to add a fresh section of facing, and at these points the concrete of the core might be allowed to dry out sufficiently to cause a well-marked horizontal division within the finished mass. But between one of these divisions and the next, the concrete, for all its appearance of horizontal stratification, does in fact harden into a single compact mass, as little likely to split along the grain as the ashlar masonry within which it is encased.

With the passage of time, and with the increasing use of more flexible facing materials, even the divisions between one stage of the work and the next tend to disappear. Horizontal joints are a regular feature of the *opus incertum* and *opus quasi-reticulatum* of the late Republic (e.g. Pl. 22, D, a terracing wall of the villa of Livia at Prima Porta). But the masons of the Empire, working in *opus reticulatum* and later in brick, by skilful use of the slow-drying properties of their mortar, were able to eliminate even these horizontal breaks in the uniformity of the concrete core. The core of the average brick-faced wall of the later Empire is still stratified horizontally; but in all other respects it is from top to bottom an absolutely homogeneous, uniform mass.

We find the same evidence of technical progress in the vaulting that accompanies this type of wall masonry. In the late Republic, e.g. regularly in the great temple of Fortuna Primigenia at Praeneste (Pl. 22, C), and often to a considerably later date in provincial Italy, we find arches and vaults turned in flat splinters of stone laid radially, like voussoirs. But the normal vault of the Imperial period in the capital was built up in horizontal layers, exactly like the walls on which it rested. The classic instance of this is in the dome of the Pantheon, the successive horizontal layers of which are mixed with progressively lighter materials, ranging from chunks of travertine at the base to volcanic *scoriae* at the crown. Such refinements were, of course, exceptional. The huge vaults of the Basilica of Maxentius (Pl. 23, A) may be taken as a typical example of later Imperial practice, in which the concrete of the vaults is identical with, and has been poured in exactly the same horizontal strata as, the concrete of the walls below. The shape of such a vault depended solely on the shape of the framework upon which it was built up; and what enabled it to stand when the framework was removed was the monolithic character of the concrete of which it was composed.

The monolithic character of Roman concrete is worth emphasizing, because a good deal of the current literature about Roman architecture is couched in terms suggesting that an ordinary Roman concrete vault differs in degree, perhaps, but not in kind, from a Gothic vault; and that one of the problems facing a Roman architect was the counteraction of the various horizontal stresses and strains that such a system of vaulting sets up.[1] There is, of course, an element of truth in this view; in particular, there was an initial period, during the drying out of the concrete and while it was still in some degree a plastic mass, during which forces of just this sort were at work. But it would be a fundamental mistake to regard the average Roman vault as if it were an active organism within which stresses could be, and regularly were, collected and transmitted to particular points of the structure below by means of ribs of brick and similar devices. It is, in fact, in this respect the absolute antithesis of the Gothic vault.

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[1] The idea goes back at least to the time of Piranesi, whose 'observations' of the structure of the dome of the Pantheon, conceived as an elaborate structure of brick ribs and buttressing arches, were taken up and elaborated by Choisy in his *L'art de bâtir chez les Romains*, Paris, 1873. It received fresh impetus and authority from Giovannoni, notably in his *La tecnica della costruzione presso i Romani*, 1925.

What has given rise to this idea is, no doubt, the fact that we do regularly find relieving arches over the doors and windows of Roman concrete buildings (Pl. 23, D); and that we do also find, though less commonly, systems of brick ribs incorporated in the structure of domes (e.g. in the 'temple of Minerva Medica' (Pl. 23, B) and the Mausoleum of Helena) and, occasionally, of cross vaults (e.g. in the Baths of Diocletian and in the Arch of Malborghetto).[1] Sometimes, as in the case of the Pantheon, the relieving arches are so elaborately contrived that one can hardly doubt that, in the intention of the architect, they were meant to regulate the internal stresses of the finished building. But one must bear in mind also that the Pantheon was a unique, and in many respects an experimental, building; and not all of its experiments were followed up.[2] Arches such as these did, in practice, show a marked tendency to shear uniformly with the surrounding concrete in the event of settlement; the absolute rigidity of the masonry within which they were incorporated made it almost impossible for them to exercise any dynamic function once the building was completed and dried out. How little importance later Roman architects attached to them in this respect can be seen from an arch like that illustrated in Plate 23, C (from the Villa of the Gordians on the Via Praenestina), which is typical of what one finds, for example, throughout the Basilica of Maxentius. The same can be seen to be true of the vaulting ribs. They are not structurally independent of the concrete envelope of which they form a part; and in several cases they are so carelessly constructed that they could hardly have stood in their own right, let alone have supported any additional load.[3] One has to conclude that such devices played little or no part in the statics of the completed building. Their use was during construction. The relieving arches simplified the initial building of the brick facing, and helped to keep scaffolding down to a minimum; and they helped to support facing and core alike during the period of drying out. The purpose of the brickwork incorporated in the vaulting is less immediately obvious; but, as Cozzo has remarked,[4] it would have helped to compartment the mass of concrete and so to limit the flow of mortar during the initial phase of drying out, and to diminish the risk of any major settlement.

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[1] G. T. Rivoira, *L'architettura romana*, Milan, 1921, figs. 219 (Minerva Medica), 246 (Baths of Diocletian), 277 (Malborghetto).

[2] The structure of the Pantheon is summarized with bibliography, by R. Vighi, *Guida al Pantheon*, Rome, 1955. To the same experimental phase may perhaps be attributed the cross-vault with unusually well-developed brick ribs in the Villa of Sette Bassi (Rivoira, *op. cit.*, figs. 168-9).

[3] As demonstrated by G. Cozzo, *Ingegneria Romana*, Rome, 1927, pp. 175-9.

[4] *Ibid*, pp. 178-9. Cf. the 'bonding-courses' of large bricks (bipedales) laid horizontally through many walls of Roman concrete (Pl. 23, D); as Corrado Venanzi (*Caratteri costruttivi dei monumenti*, i, Spoleto, 1953, p. 27) rightly remarks, they are a source of weakness rather than of strength to the wall that contains them.

Asia Minor and the Aegean world had no comparable tradition. So far as the writer is aware, it is only in Cilicia that one finds any considerable use of a material that resembles Roman concrete both in its structural qualities and in the way it is used. One finds it, for example, in the harbour-mole of Elaeusa-Sebaste and in the bath-buildings of Korykos (Pl. 24, A, B), where the monolithic qualities of this Cilician concrete are well demonstrated by the size of the fallen lumps. That it found its way to Cilicia directly from Italy can be inferred with reasonable certainty from the fact that one of the best and earliest example is a bath-building at Elaeusa-Sebaste, which is faced in typically Italian *opus reticulatum* with brick details (Pl. 25, A, B, C, D),[1] a medium of which only some half-dozen examples are recorded from the whole of the eastern Mediterranean.[2]

Cilicia is in this respect exceptional. What one meets everywhere else in Asia Minor is something which at first sight resembles Roman concrete, and which may well represent a translation into terms of the local materials of the Roman concrete architecture of the late Republic[3] but which on closer examination is found to differ from it in precisely those characteristics that gave the fully developed Roman concrete its special architectural character. Like Roman concrete it consists essentially of irregular lumps of whatever stone might be available, laid in horizontal courses. As a typical example of this sort of work we may take the north façade of the mid-second-century Vedius Baths and Gymnasium at Ephesus (Pl. 26, A, C).[4] This impressive monument rests, on this side, on a terraced substructure of massive limestone masonry; and the actual façade is of two builds, the lower part faced with carefully coursed, squared blocks of the same stone (average for 5 courses, 110 cm.), the upper part set back and brought to a rough face, which cannot have been meant to be seen and was presumably faced in some other material, probably marble. At intervals there are doors and relieving arches, the door-jambs being built up of substantial squared blocks of coarse, local marble, and the arches of limestone voussoirs. The core is coursed rubble; and what immediately distinguishes it from comparable Roman work in Italy is that not only is the mortar far less compact, but the layers correspond exactly to those of the facing. Core and facing were evidently built in a single operation, each course being completed before the next was begun.

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[1] *Monumenta Asiae Minoris Antiqua*, iii, p. 222, figs. 177–8, cf. Pl. 25, E, a characteristic early Imperial example at Chieti in Italy (brought to my notice by Mr. Gough).

[2] Another example in Asia Minor is recorded at Amasia (anc. Amisos) in Paphlagonia (*Cahiers Archéologiques*, vii, 1954, p. 100, pl. XXXVIII, 1).

[3] A Roman origin is suggested by Deichmann, *op. cit.*, p. 25.

[4] For this and other buildings in Asia Minor referred to in the following pages, see the list (pp. 96 ff.).

This is a type of masonry of which one could cite innumerable examples, very often used, as here (cf. Pl. 26, C), in association with traditional ashlar masonry, in the bath-buildings, theatres, amphitheatres, stadia and similar buildings of a hundred cities up and down the southern and western coasts of Asia Minor, and again in northern Greece. A few typical examples will suffice to illustrate at once its variety and its essential sameness: the Amphitheatre at Pergamon, the core of which is built up of rounded, water-worn stones (Pl. 27, B; the ashlar on the left is that of the outer face and angles of the main radiating walls); at Miletus, the Heroon near the Agora (Pl. 28, A; rather more carefully faced than is usual at Miletus, where the local stone did not lend itself to fine work), the Baths at the foot of Humeitepe (Pl. 27, A; a more characteristic example of local work), and the aqueduct leading to the Agora Nymphaeum (Pl. 28, E; a variant facing in small, irregular lumps of stone); at Ephesus, the fourth-century repairs to the Stadium (Pl. 29, B; poor, late work); and at Ak Kale, near Elaeusa-Sebaste in Cilicia (Pl. 24, D, E), in a building which may be as late as the fourth or fifth century, but which illustrates the sort of quality that could be achieved when conditions were suitable. The quality and character of the finish might vary greatly, depending on the importance of the building, and still more on the sort of stone that was available. But despite superficial variations, the essential characteristics of this type of masonry are remarkably constant, and may be summarized as follows:

(*a*) The core is laid in precisely the same courses as the facing; each course represents a single stage in the construction, running right through the masonry mass.

(*b*) The proportion of stone to mortar is higher than in any but the poorest Italian concrete.

(*c*) The construction is far looser than in Italian concrete. The mortar dried so quickly that one finds frequent gaps between successive courses; it never had a chance to fuse into a single compact mass.

In other words, this is essentially a masonry of rubble laid in courses and bound with mortar; it is not a concrete in the sense in which one uses the word of Roman concrete architecture. The actual building processes are very similar; but the architectural properties of the finished products are very different.[1]

The essential difference between this sort of masonry and Roman concrete of the Imperial age is something that emerges even more clearly when one turns to examine the types of vaulting that are normally associated with it. There are really only two forms in regular use, the barrel vault and, over circular rooms, the dome; and, no matter how much these may vary in detailed treatment according to local circumstances, they share one absolutely constant characteristic: the masonry was never poured in horizontal layers against a timber centring; just as in the earlier forms of Roman vaulting (Pl. 22, C) it was carefully built up in concentric courses, so that the inner surface of the vault appears as a series of courses of flat stones laid radially to the curve of the vault. Upon this framework might be laid horizontal courses of mortared rubble, but this was no more than an inert fill, supported by the masonry on which it rests: it was the dynamic qualities of the vault itself that did the work.

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[1] It is for this reason that the term 'mortared rubble' has been adopted in preference to '*opus caementicium*' (see p. 57, n. 1).

Once again, a few selected examples must serve to illustrate both the variety and the essential sameness of this sort of work. The corridor underlying the seating of the first-century Stadium at Ephesus (Pl. 29, C; cf. Pl. 26, D, vaulted tabernae along the west front of the Vedius Baths) is an excellent instance of a barrel vault built up of two concentric rings (together 70 cm.) of flat stones laid radially and supporting an inert mass of horizontally coursed rubble, the outer face of which is contained by a facing of heavily bossed ashlar masonry similar to that used in the contemporary Theatre. In the fourth-century repairs to the same building (Pl. 29, B) we see exactly the same sort of vaulting, combined with (bottom right) arches of cut-stone voussoirs like those used in the Vedius Baths two centuries before and (top left) smaller arches of brick. At Miletus a barrel-vaulted exedra in the Baths of Faustina (Pl. 28, B) will serve to illustrate a characteristic trait of the vaulting on this site, the use of different sizes and shapes of stone at the spring and at the crown. This is a feature that one meets again, for example, not only in the barrel vaults but also in the domes (Pl. 28, C) and semi-domes of the Baths of C. Valerius Capito, near the Agora, and, in an extreme form, in the vaults of the Agora Fountain Building, the crowns of which consist each of a narrow wedge of long, thin slabs, pitched on edge to form a sort of composite keystone to a vault of otherwise conventional character. At Pergamon, in the Gymnasium, we see much the same sort of differentiation carried out in a more tractable stone (Pl. 27, E), side by side with barrel vaults (Pl. 27, D) that recall those of the Stadium at Ephesus. Here at Pergamon, in the Trajaneum, in the Gymnasium and in the Asklepieion (Pl. 27, C, which illustrates a part of the vaulted substructures of the second rotunda) we see the whole range of this Roman-period masonry at its most characteristic: fine ashlar work in the Hellenistic tradition, walls of mortared rubble faced with small squared blocks, and this characteristic vaulting used in a wide variety of combinations to meet the varying requirements of each individual building.

By comparison with ashlar and with mortared rubble, buildings of brick are not at all common in pre-Byzantine Asia Minor. But they do exist. Unquestionably the finest of them is the Serapaeum at Pergamon, which must date from somewhere about the turn of the second and third centuries. The two rotundas (Pl. 30, A) and some of the subsidiary structures are built of the usual mortared rubble faced with small squared blocks; but the great central hall (Pl. 30, D), except for a certain number of built-in marble details, is constructed entirely of brick (bright red bricks, 29-35 cm. square by 4·5-5 cm., laid in white mortar and carefully pointed; 10 courses to 64-65 cm.). At first sight this bears a remarkable resemblance to Roman brickwork, a resemblance that is accentuated by the employment of what may be regarded as a local equivalent of the Roman *bipedalis* (average, 52 cm. square) for such features as the relieving arch over a drain in the north wall of the main hall (Pl. 30, E). The resemblance, however, is only skin-deep; wherever the surface has been removed (e.g. Pl. 30, C, one of the internal piers of the hall) it can be seen to be built not of concrete or mortared rubble faced with brick, but of mortared brick throughout.

Such a building was doubtless exceptional; but it was by no means unique. We find brick used in precisely the same way in at least two major surviving monuments: the third-century aqueduct at Aspendos, for the upper parts of the two great pressure-towers, and the Great (Harbourside) Baths at Ephesus, for the lateral arcading of the fourth-century atrium (Pl. 29, E; the individual bricks are of two dimensions, both thicker proportionately than the normal Byzantine brick and laid to a relatively narrow joint: 5 courses to 34 cm.) and for large parts of the second-century superstructure (Pl. 29, D). There were, no doubt, other instances; a building so constructed was very vulnerable to the activities of later builders in search of materials, and only if it were very remote or had remained in active use was there any real likelihood of its survival. It is probably true, none the less, that throughout the pre-Byzantine period brick was far commoner as a secondary building material, to be used for certain types of constructional detail, than it was for the building of masonry masses. We find it already so used in the upper part of the structure of the Library of Celsus at Ephesus (Pl. 29, A), the individual bricks of which are of a pale, warm red colour, averaging 33 cm. square by 5 cm., and are laid on an average of 5 courses to 40 cm.; there are relieving arches of the same brick over the niches.

This is an unusually clear and well-dated case, and it will serve to illustrate the kind of uses to which we find it put—apses (e.g. Pl. 25, c, in the 'Reticulate' Baths at Elaeusa-Sebaste), decorative niches (as in the third-century Nymphaeum in the Agora at Aspendos), and above all in bath-buildings, where, in the absence of detailed architectural survey, it is often very hard to distinguish this work from that of later additions and repairs. It is, however, in two rather specialized contexts, for bonding-courses and for vaults, that it makes its most significant appearance; and since both of these were later to play an important part in Byzantine architecture, they are worth examining in rather greater detail.

Bonding courses make their first appearance in the Reticulate Baths at Elaeusa-Sebaste, in a context which makes it reasonably certain that they were directly inspired by Roman usage. There was, however, an important difference between the horizontal courses of brickwork found in Roman *opus mixtum* and those used in the later Imperial architecture of Asia Minor. In the former, as one sees very clearly, for example, in Hadrian's Villa, the sole purpose of the brickwork is to give stability to the reticulate facing (which is how it is used in the baths at Elaeusa-Sebaste and, with other types of facing, in a certain number of later buildings in Cilicia, e.g. in several buildings at Erzin (Epiphaneia? Pl. 24, c), where we find superficial courses of brick used in conjunction with a facing of coursed blocks of black basalt); it penetrated into, but very often did not run right through, the concrete core. Used in conjunction with mortared rubble, on the other hand, it normally runs right through facing and core alike; it had the more important function of consolidating and binding together the whole rather loosely knit masonry mass. In this respect it represents a development parallel to that which took place under the later Empire in some of the western provinces, notably in Gaul.

As a well-developed and well-documented example of this sort of work we may take the walls of Nicaea (Iznik), the main lines of which belong almost certainly to the period between the Gothic invasion of 258 and the year 269, which is the date of the surviving inscription of the South Gate and of an identical inscription recorded from the West Gate. These walls were many times repaired, but the original work, a curtain wall with rounded towers at intervals of 35-50 m., is still easily recognizable, particularly in the stretch that runs eastwards from the South Gate (Pl. 31, B, C, D). The towers are faced with brick, in places to a depth of as many as four bricks, with a mortared rubble core. The individual bricks are very variable, from 30 to 36 cm. square and ranging from an average of 3 cm. up to 6 cm. (and in an exceptional case near the Istanbul Gate up to 8 cm.) in thickness. The core, too, is very variable, ranging from a tumbled and rather loosely packed rubble to a careful alternation of bands of rubble and courses of brick. The mortar of both brickwork and core is white, with a certain proportion of gravel and crushed brick, and the joints are finished to a depth of 2-3 cm. with a much harder, finer mortar, salmon pink in colour and scored with a trowel-point to mark the vertical joints. A singular feature of these third-century towers is the narrow, dog-legged corridor, barrel-vaulted in brick, which provides access from the interior of the city to the ground immediately in front of the curtain wall (visible at the junction of tower and wall in Pl. 31, B).

The curtain wall (3·6-3·85 m. thick) is of a more economical build, and consists of broad bands of mortared rubble (1·7-2·1 m. high) alternating with narrow bands of brick, each of 4 courses (27-31 cm. high). The bricks and the mortar are as in the towers. The facing of the rubblework consists of irregular chunks of stone fitted loosely together and brought to a good surface with the aid of a liberal application of mortar. This is a variant of the coursed rubblework technique that is liable to occur wherever the stone could not easily be dressed into regular blocks, and in such cases, for obvious practical reasons, it was usually found convenient to lay facing and core alike in rather wider bands than the single courses of ordinary coursed rubblework; a good early example of this can be seen in the substructures of the great temple of Hadrian at Cyzicus. In the walls of Nicaea the facing, and with it the core, can be seen to have been built up and levelled off in successive layers, each some 50-65 cm. high (clearly visible in Pl. 31, C, D; in B the brick tower is contemporary with the wall; in C and D it is an addition, probably of the fourth century).

By the third century this sort of masonry, though by no means as common as the simple mortared rubblework without brick, was well established in Asia Minor. Good examples in ordinary civic use can be seen in the aqueduct at Aspendos, where bands of three or four courses of brick were used, alternately with bands of a somewhat irregularly faced, mortared rubble, in the construction of the ramps of the pressure towers (Pl. 31, E); and again in the baths at Ancyra (Ankara), where the facing of the rubblework is in courses of small, neatly squared blocks of limestone (Pl. 31, A). At Spalato, for all the roughness of the rubblework facing (due to the intractable character of the local stone), the combination of brick and rubblework (as we see it, for example, in the Vestibule) is handled with a skill and flexibility that betoken a well-established constructional tradition; for the most part it is used in conjunction with ashlar masonry, as in the substructures of the basilical hall, where the lower part of the walls and the piers are of ashlar, the upper part of the walls of alternate bands of rubblework and brick with brick-turned windows, the crown of the vault of radiating courses of rubble laced here and there with single brick-courses, and the spring of the vault of solid brick corbelled out along the line of curvature in horizontal courses. At Nicomedia there is nothing that can certainly be attributed to Diocletian, although there is record of cisterns built in coursed rubble and brick, which might well be of this date. At Salonica, on the other hand, there are the considerable remains of the Palace of Galerius, and at least two of the better preserved buildings make liberal use of masonry of this type. The general character of this Salonican masonry can be seen in Pl. 33, D, E, which illustrate, respectively, a part of the outer face of the drum of the church of St. George (which may have been built as the mausoleum of Galerius), and a detail of the large octagonal building recently excavated to the south of the Via Egnatia, near the Arch. In both, the quality of the rubblework was determined by the quality of the local stone, a dark green, schist-like rock which splinters but will not cut, and which had therefore to be used very much as in the walls of Nicaea, in bands composed not of a number of single courses but of two or three more substantial layers of rubble and mortar, built up and levelled off at intervals of about 35 cm. It was brought to a face by means of the liberal use of an applied mortar, and in the case of the octagon this can be seen to have been pointed up with scored lines, roughly outlining the individual blocks (Pl. 33, E); the horizontal line near the top of the photograph marks the line between one constructional layer and the next. The only substantial difference between this sort of work and what we find, for example, in the later fourth- or early fifth-century walls of the same city (Pl. 33, C) is that in the latter, although the rubblework is clearly built up in roughly horizontal courses, the builders do not seem to have thought it worth while formally to level it off into distinct successive layers. It is quite evident that the building-techniques of early Byzantine Salonica (cf. St. Demetrius, Hagia Sophia, the Acheiropoietos church) were firmly rooted in pre-Constantinian practice.

Surviving brick vaults of the Roman period are rare in Asia Minor, and indeed throughout the Roman East, where the percentage of classical buildings that have remained in continuous use, and have thus had a reasonable chance of retaining something of their ancient superstructures, is far lower than in some of the more favoured provinces of the West. In Asia Minor, brick as a vaulting material may never have been as common during the Roman period as the traditional materials; but there is plenty of evidence to show that it was, none the less, widely used, at least from the middle of the second century onwards. One of the earliest and certainly one of the most interesting examples is the Temple of Asklepios Soter at Pergamon, dated by the excavators to just before the middle of the second century. The materials and methods used in this building acquire added significance from the fact that it was almost certainly directly modelled on the Pantheon, built some twenty years earlier. Instead of the carefully graded, brick-faced concrete of the Pantheon, the drum was built of fine ashlar, fastened with metal cramps, and the dome of brick laid radially and reinforced at the spring by an outer ring of mortared rubble. One could hardly ask for a more graphic illustration of the blend of ideas that went to make up this provincial architecture: a Roman design carried out in a building tradition which was essentially local, but which in matters of vaulting was prepared to assimilate and to adapt a material, brick, which also was presumably derived ultimately from Rome. When one reflects that the mortared rubble of the temple and of the adjoining structures may itself be a translation into local terms of an earlier phase of Roman concrete construction, one realizes how closely interwoven were the various traditions that went to make up the architecture of Roman Asia Minor.

Once introduced, bricks, laid radially and backed with mortared rubble, came increasingly to be used in place of the radially pitched stone vaulting of earlier Imperial practice, for which it was clearly a highly efficient substitute. At Miletus, the Baths of Capito, built in the sixties of the first century, and the Baths of Faustina (Pl. 26, E), built about a century later, serve to document the change. Brick barrel vaults similar to those in the Baths of Faustina, i.e. a single thickness of bricks supporting a mortared rubble fill, are found as far afield as Perge in Pamphylia; and we may suspect, though we cannot always prove, that similar vaulting was in use for barrel vaults, for passages and staircases, and for domes, wherever such occur in the monumental architecture of the third century in Western Asia Minor. That they were by no means exclusively used in bath-buildings we know from such proven examples as the Heroon of Miletus, some of the mausolea at Ephesus, the wall-towers at Nicaea, and the staircases in the Serapaeum at Pergamon and in the aquaduct-towers at Aspendos.

For actual surviving examples of brick vaulting on a monumental scale it is, however, once again to the buildings of the Tetrarchy that we have to turn. At Salonica the original brick vaults of the church of St. George have survived virtually intact. The dome, as one can see where it has been cut through to make the eastern arm of the church, has an intrados of bricks laid radially, several bricks thick and backed, at any rate up to a certain height, with mortared rubble. The structure of the vaults of the radiating bays (Pl. 33, A) is more complex. It consists, in effect, of an inner and outer arch, each consisting of three concentric rings of radial bricks and corresponding, respectively, to the inner drum of the building and to the present outer wall; and, between these two arches, a short length of barrel vaulting, of which the lower part is laid radially and is of one build with the two delimiting arches, whereas the upper part (Pl. 33, B) is built of pitched bricks converging from four sides to meet in the centre of the crown. From ground-level it is impossible to see whether the bricks of the two sides of this central panel that are laid across the axis of the vault are strictly vertical, or whether (as would be structurally more logical) the outermost courses are pitched at a slight angle to the vertical, so as to get some support from the arches against which they rest. In either case the resemblance to Byzantine methods of building is far too close to be accidental. These vaults and the more fragmentary, but essentially similar, vaults of the Arch of Galerius are enough to show that, in its vaulting, as in the structure of its walls, the Salonica of Galerius anticipates much that is typical of the local architecture of succeeding centuries.

At Spalato, in addition to numerous arches and recesses, there is at least one substantial semidome built partly in brick; and the brick corbelling of the vaulted substructures of the basilical hall (p. 87) may be held to look forward to Byzantine practice. An even more striking example can be seen at Aspendos, in Pamphylia, in the substructures of the basilica, a building which dates probably from the second half of the third century and which incorporates a group of long, narrow rooms, with brick barrel vaults, of which some twenty courses on either side are laid radially, whereas the crown is built of brick pitched in typical Byzantine manner (Pl. 32). Here is explicit and unmistakable evidence that in vaulting, too, Byzantine methods were rooted in practices already current in Asia Minor and the Northern Aegean before the foundation of Constantinople.

What were the remoter origins of the sort of vaulting found in the substructures of the basilica at Aspendos and (in a somewhat modified form) in the radiating bays of the church of St. George at Salonica? The material, kiln-baked brick, was, as we have seen, presumably introduced in the first place from Rome; and used radially for barrel vaults and domes, it is no more than a translation of existing local building practices into a new and more efficient material. But for the pitched-brick vault there is no precedent in the architecture either of the Roman West or of Asia Minor itself. It has, on the other hand, long been recognized that the structural principles involved were known and used in the ancient East at least as early as the second millennium B.C.,[1] and this fact would doubtless have received more dispassionate appraisal had it not become involved in the Strzygowskian polemic. Critics of Strzygowski's theories have been able to claim, with some justice, that of the examples usually cited none can be shown to fall between the time of Sargon (722-705 B.C., at Khorsabad) and the sixth century A.D. (Ctesiphon, Kasr ibn Wardan); and whereas the earlier group is far too early to be considered seriously as the immediate source of Byzantine building practice, the later group might equally well be held to have been itself derived from Byzantine models.

What does not seem to have been generally appreciated is the fact that there is evidence, limited in quantity but quite explicit, to show that both in Egypt and in Mesopotamia pitched-brick vaults of this sort were in use throughout the classical period. The reasons why they have escaped attention are simply stated. In the first place, it is because all too often the classical levels of the sites where they might be expected to have been preserved have been removed with high explosives or similar means by excavators intent only on exploring the remains of earlier cultures; and secondly, it is because the material of which they were built, crude brick, is one that cannot be expected to survive except under certain unusually favourable conditions. This was essentially a crude-brick technique. It was at home in those countries where timber was in perennially short supply, and where the normal building material was mud mixed with straw and dried in the sun, and where the normal mortar was mud.

The outstanding site, not because it was in any way unique, but because it is the only comparable site to have been carefully dug and recorded, is the small town of Karanis in the Fayum, excavated some thirty years ago by the University of Michigan under the direction of Professor A. E. R. Boak and Professor E. E. Peterson.[2] This site seems to have been first occupied about the beginning of the Christian era, and by the fifth century it was in full decline. Within these broad limits the excavations revealed a series of successive houses, in places superimposed with all the complexity characteristic of a continuously occupied site, elsewhere clearly divisible into three distinct building-levels. Stone was used for the town's two temples; but elsewhere it is found only in foundations and occasionally in features such as staircases. Wood is a great deal commoner than might have been

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[1] See references collected by K. A. C. Creswell, *Early Muslim Architecture*, vol. i, 1932, p. 349, n. 1.

[2] A. E. R. Boak and E. E. Peterson, *Karanis, 1924-28*, and A. E. R. Boak, *Karanis, 1929-31* (University of Michigan, Humanistic Series, 25, 1931). My warm thanks are due to Professor Boak and to Dr. Peterson, and to the Kelsey Museum of Archaeology, University of Michigan, for putting at my disposal further unpublished information about these important excavations, and for allowing us to use the drawings and photographs of typical vaults reproduced on Pl. 34 and Fig. 20.

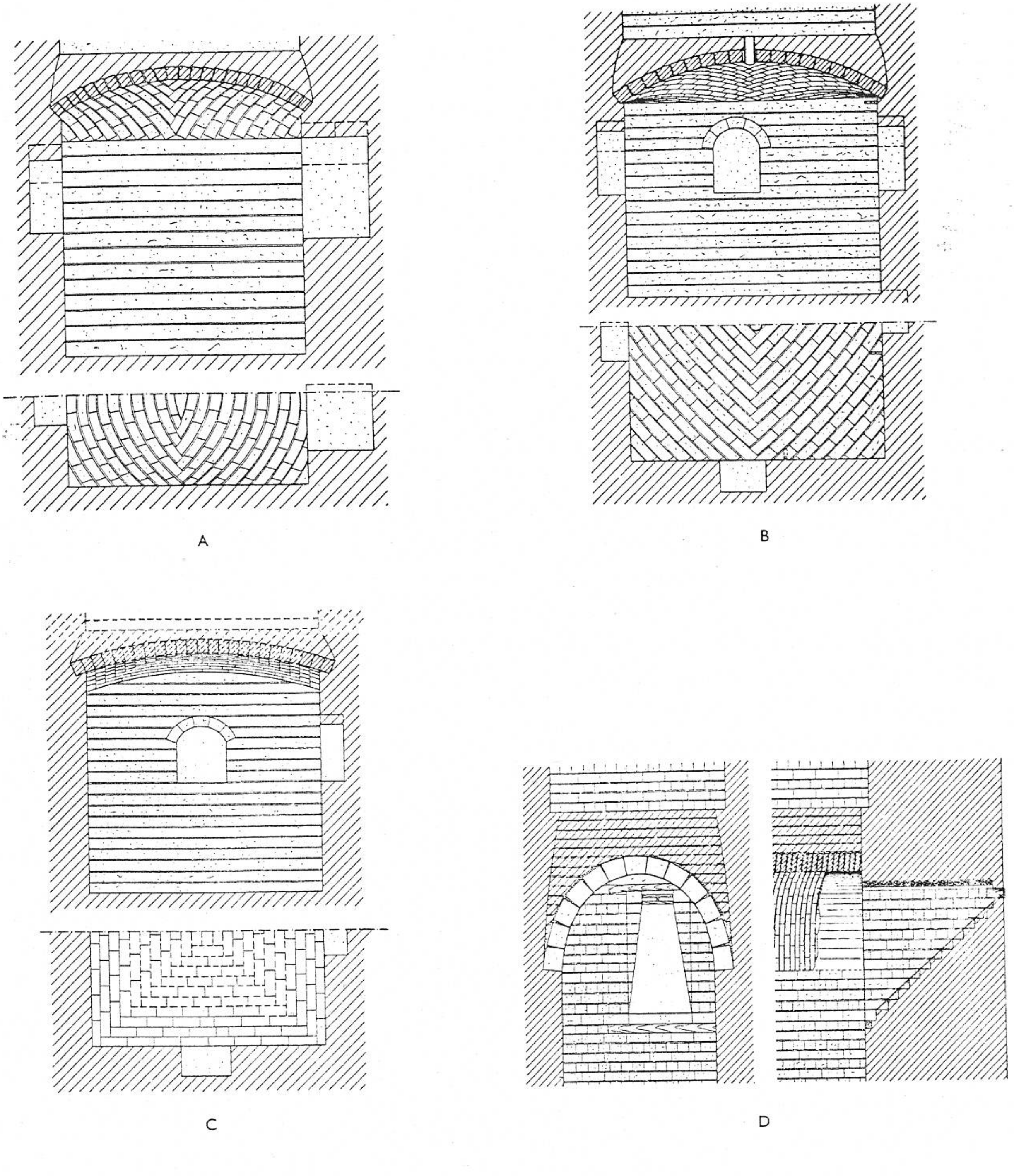

FIG. 20. Building methods, Karanis (Egypt): types of vaulting in crude brick. (By courtesy of the Kelsey Museum of Archaeology, University of Michigan.)

expected, at any rate during the first and second of the three main periods distinguished by the excavators. Not only was it regularly used for such elements as window-frames and door-frames, staircases and cupboards, but there are numerous flat ceilings laid on small, irregular timbers. In all three periods, however, here as in the neighbouring and closely comparable site of Soknopaiou Nesos (Dimay),[1] the basic building material is crude brick bound with a mortar of fine mud and used with great virtuosity. A striking feature of both sites is the number of brick vaults, and the skill and variety with which they were constructed. They include not only barrel vaults of the familiar pitched-brick type (Pl. 34, A, C, D) but also a variety of ingeniously constructed domical vaults, often of a pitch far shallower than was ever attempted by the Byzantine architects. No less than three different ways of setting a domical vault over a square room can be distinguished: those built up of concentric courses and springing from pendentives at the angles (i.e. essentially as in Pl. 7, A, B, but normally with a flatter curvature); those with courses laid diagonally across the corners and interlocking along the two cross-axes (Fig. 20, B; Pl. 34, E; in a vault of that sort the springing-line is horizontal); and those with courses laid parallel to the side walls and interlocking along the diagonals (Fig. 20, C; cf. Pl. 35, B). In a letter to the writer, Professor Boak remarks that (at Karanis) 'nearly every large house or public building, such as the granaries, had an example of barrel vaulting, and many had a domical vault in addition. The examples from Soknopaiou Nesos indicate that this practice was not confined to Karanis, an opinion confirmed by the observation of both types in the ruins of Tebtunis and of Bacchias by Peterson and myself. In fact, the barrel vault at least was still being used in the construction of mud-brick dwellings in one of the villages near Aswan as late as 1932.'

In Mesopotamia, where, as in Egypt, similar traditions have survived down to the present day (cf. Pl. 35, B, illustrating the construction, without scaffolding, of a typical mud-brick vault in Southern Iran),[2] the evidence is more scattered. At Dura the excavators record at least two vaults of this sort, in the House of the Roman Scribes (which was built up against the city wall and buried when this was strengthened towards the middle of the third century) and in Bath M.7 (not precisely dated, but of the Roman period); in both cases the evidence has survived because, unlike the majority of vaults from this site, these were built of baked bricks.[3] At Seleucia, in the majority of the tombs examined by the American expedition, the barrel vaults were laid radially, but in two cases (both from the second level, dated *c.* A.D. 43-115) the bricks were pitched, in one of them the whole vault, in the other the crown of a vault of which the shoulders were laid radially.[1] At Assur, the ancient capital of Assyria, the German excavators found a number of graves barrel-vaulted in pitched brick, one of which they date to the Middle Assyrian and the rest to the late Assyrian period.[2] When, after an interval, the site was reoccupied in Parthian times it is, significantly, this sort of vaulting that was used for the larger spans, either in simple form or in various combinations of pitched and radial bricks, and often strengthened with projecting radial ribs.[3] At Hatra, where crude brick was the normal building material, the current excavations[4] have as yet yielded only one vault partially intact. This is one of the private temples (dating from the first to the third centuries A.D.), the transverse rectangular halls of which were regularly vaulted with the aid of two or four supporting ribs carried either on engaged piers or on brackets projecting from the two long walls. It is the spring of the arch carried by one of these piers that has survived in the south-west angle of Temple VIII, a small and rather simple shrine dedicated to Samya, which was later rebuilt on a more grandiose scale. It is built, as such an arched rib was bound to be, of bricks laid radially. The rest of the vault has collapsed; but the fact that ribs were used in it and in the corresponding vaults in other temples is enough in itself to suggest that these were not usually built of radially laid bricks but in some form of vaulting to which such ribs would have served as an effective support (cf. the transverse ribs of many of the towers of the walls of Constantinople; above, p. 67). With the example of the neighbouring city of Assur before us, it seems very likely indeed that the vaults of the Hatrene temples were of pitched brick, divided up and strengthened, as was the regular rule, with radially laid ribs. This conclusion is strikingly confirmed by the substructures of one of the mausolea of the South Cemetery, which, although built not in actual bricks but in flat stones laid like bricks in gypsum mortar, is barrel-vaulted in typical pitched-brick technique (Pl. 35, A).

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[1] A. E. R. Boak, *Soknopaiou Nesos* (University of Michigan, Humanistic Series, 39, 1935.)

[2] For the use of this illustration we are indebted to Mr. Eric Gordon and the Oxford University Expedition to Persia, 1950.

[3] *The Excavations at Dura-Europos. Preliminary Report of the Sixth Season of Work*, 1932-33, New Haven, 1936, pp. 84, 266.

Hatra was sacked in the middle of the third century A.D. and virtually abandoned thereafter, and the evidence that it affords is particularly valuable, therefore, as casting light on a dark period of Mesopotamian archaeology. The emergence of pitched-brick vaulting in Sasanian and early Islamic times was not a new phenomenon, but had its roots in long-established local building traditions. What was new at Ctesiphon (Pl. 35, C, D) and at Samarra (to cite two of the best-known examples) was the material, kiln-baked brick, a refinement which may well have been due to Byzantine influence. We may compare the introduction of kiln-baked brick into the Roman East: the material was new, but the ways of using it were rooted in the local past.

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[1] I owe this information and photographs of the vaults in question to the kindness of Professor Clark Hopkins. See also L. Waterman, *Second Preliminary Report upon the Excavations at Tel Umar, Iraq*, 1933, pl. XX.

[2] Arnt Haller, *Die Gräber und Grüfte von Assur* (Ausgrabungen der deutschen Orient-Gesellschaft in Assur, 7), Leipzig, 1933, pp. 159-69.

[3] W. Andrae and H. Lenzen, *Die Partherstadt Assur* (Same Series, vol. 8), Berlin, 1954, p. 27 ff.

[4] *Illustrated London News*, 18 and 25 December 1954, pp. 1115-17, 1160-1.

Seen in this perspective, the problem of the origins of the sort of vaulting that we find in the third century at Salonica and at Aspendos can hardly be in doubt. It must represent the translation into more durable materials of a building technique with which Rome was in everyday contact in those parts of the Roman East where crude brick was a normal building-material. As used in Asia Minor, it marks a further stage in the assimilation of fresh ideas into the vigorous local school of provincial Roman architecture. We may compare it with the introduction of brick vaulting a century or so earlier, except that then it had been the materials that were new and the methods those of established practice, whereas now it was the materials that had become part of the local tradition and the way of using them that was new. In this connection it is well to recall that crude brick was far commoner in the Roman world than the impression given by the surviving remains would suggest. It was not by any means confined to the provinces of the East. As late as the end of the Republic, Rome itself had been largely a city built in *opus latericium*; and although in certain parts of the Roman world it was then largely abandoned in favour of the more durable kiln-baked brick, there were many provinces where it remained the normal building material for any but monumental architecture. In Tripolitania, for example, temples and public buildings were built of stone or marble, and bath-buildings of stone and Roman brick; but the upper stories of private houses were regularly built of timber and crude brick. Evidence of this sort is only preserved under exceptionally favourable conditions; and until the architecture (and particularly the domestic architecture) of the eastern provinces has received a great deal more attention with this particular problem in mind, it will not be easy to be more specific. In particular, it would be idle at present to speculate how widely the sort of vaulting with which we are concerned had spread in its traditional medium before coming into contact with Roman building methods and materials. What is certain is that, wherever the actual point of contact may have been, there were plenty of opportunities for mutual influence. Of the resultant exchange Constantinople and Ctesiphon may be held to be the reciprocal products.

APPENDIX

AK KALE (Cilicia, 10 km. north-east of Elaeusa-Sebaste; see map, *Monumenta Asiae Minoris Antiqua*, iii, 1931, pl. I). Pl. 24, D, E.

There is no substantial publication of this interesting site. The two outstanding buildings are a well-preserved cross-in-square chapel and the substantial remains of a fine castle or fortified residence, which is probably contemporary. Both are built partly of cut stone, partly of neatly faced mortared rubble. The masonry illustrated on Pl. 24, D, E, is that of the inner courtyard of the castle.

ANCYRA (Ankara). Bath-building. Pl. 31, A.

Unpublished.

Four courses of brickwork (bricks av. 30 cm. square by 4·5-5·5 cm.) alternate with 4-6 courses of mortared rubble, the latter faced with small squared blocks of pink limestone (av. 12-15 cm. high; 4 courses, 60-66 cm.; 6 courses, 98 cm.).

(For information about the masonry of this building, and for photographs, I am indebted to Mr. David Stronach and to Mr. M. B. Cookson.)

ASPENDOS (Pamphylia). Aqueduct (Pl. 31, E), Basilica (Pl. 32), Nymphaeum.

K. Lanckoronsky, *Städte Pamphyliens und Pisidiens*, Vienna, 1890, vol. i, pp. 93-102.

J. B. Ward Perkins, 'The Aqueduct of Aspendos', *Papers of the British School at Rome*, 1955, pp. 115-23 (referring also to the other buildings).

At the point where the basilica crosses the head of a deep re-entrant gulley there are two tiers of substructures, the deeper of which was probably used for water-storage. It consists of certainly three, and probably five, narrow transverse chambers beneath the central nave, each measuring 3·2 (3·35) m. by 11·50 (11·8) m., and accessible from three large rooms beneath the east side-aisle. The end walls of these transverse chambers are of coarse ashlar, the side walls of mortared rubble capped with a projecting course of large stone blocks. From this projecting course spring barrel vaults, consisting of 18-22 courses of bricks laid radially along either side, with a crown of bricks pitched on edge in the Byzantine manner. The individual bricks measure 34 cm. square by 7·5 cm. (estimated dimensions) and are laid to a very close joint. These vaults are certainly contemporary with the basilica, which is pre-Constantinian, probably of the third century.

CYZICUS (Bithynia). Temple of Hadrian.

G. Perrot, 'Le temple d'Hadrian à Cyzique', *Revue Archéologique*, 1864, pp. 350-60.

F. W. Hasluck, *Cyzicus*, Cambridge, 1910, pp. 10-15.

Bernard Ashmole, 'Cyriac of Ancona and the Temple of Hadrian at Cyzicus', *Journal of the Warburg and Courtauld Institutes*, xix, 1956, pp. 179-191.

The substructures of the cella consist of three parallel, barrel-vaulted tunnels, of which the outer pair of walls is of ashlar, the inner pair of mortared rubble with an ashlar springing-course for the vault. The rubblework is faced with small irregular blocks, as in Roman *opus incertum*, but is brought to a neat horizontal joint every 40-50 cm. as if to simulate courses of masonry. The vault is of rubble, laid radially.

The amphitheatre in the same city was built of a more conventional, coursed rubblework, with ashlar quoins and some use of ashlar in the main bearing walls.

ELAEUSA-SEBASTE (Ayas, Cilicia). Reticulate Baths. Pl. 25, A, B, C, D.

Monumenta Asiae Minoris Antiqua, iii, 1931 (J. Keil and A. Wilhelm, *Denkmäler aus dem Rauhen Kilikien*), pp. 222-3, figs. 177-8.

Bricks, sandy pink, 26-27 cm. square by 4·5-5 cm. (5 courses, 33-35 cm.); hard, grey-brown mortar, containing tiny chips of stone and pebbles, and smoothly pointed. The reticulate is in white local limestone, in bands av. 125 cm. high. The core of the walls is of concrete, resembling Roman concrete in texture, with splinters of white limestone for aggregate, the successive courses fusing into a unified whole. The main vaults, on the other hand, consist of an intrados of rough stone, laid radially, and a backing of mortared rubble, in distinct, horizontal layers, 20-35 cm. apart. The surviving apse has a drum faced with brickwork and a semidome built partly of brick and partly of a dark, pumice-like stone, with a square window in the drum and a brick-turned oculus in the semidome above it (Pl. 25, C).

EPHESUS

(*a*) The Library of Celsus. Pl. 29, A.

Forschungen in Ephesos, vol. V, 1, 1953: *Die Bibliothek.* J. Keil, *Führer durch Ephesos*, 1930, pp. 80-3.

Built in honour of Ti. Julius Celsus Polemaeanus, who died not later than 117, by his son Ti. Julius Aquila. The lower part of the walls, to a height of 4 m., is of coarse blue marble blocks, the upper part of brickwork. The individual bricks are pale, warm red, av. 33 cm. square by 5 cm. and laid 5 courses to 40 cm. The horizontal joints are smoothed with a rounded tool, as in Byzantine masonry, but the jointing, proportionally to the brick surface, is far narrower.

(*b*) The Baths and Gymnasium of Vedius. Pl. 26, A, B, C, D.

Österreichische Jahreshefte, xxiv, 1929, Beibl. 20-45; xxv, 1929, Beibl. 21-33; xxvi, 1930, Beibl. 18-19, with plan after completion of excavations, Abb. 6 = 132. *Führer*, pp. 41-6.

Built by P. Vedius Antoninus, temp. Antoninus Pius. In addition to mortared rubble, cut stone is used extensively for the main bearing walls. By comparison with the two following buildings, the use of brick is limited. The illustrations show the outer north wall (Pl. 26, A-C; mortared rubble with cut stone details, on a footing of cut stone) and the tabernae of the west street-frontage (Pl. 26, D).

(*c*) The Great or Harbour Baths. Pl. 29, D, E.

ÖJh., i, 1898, Beibl. 62-3, 71-9 (cf. *Forschungen*, vol. i, 181 ff.); xxviii, 1933, 14-23. *Führer*, pp. 56-9.

Not completely excavated. In their present form the Baths appear to date from the second half of the second century (the date of the architectural ornament of the Frigidarium), perhaps replacing an earlier bath-building on the same site, along the west side of the adjoining gymnasium, which is Flavian. So far as can be seen in its present overgrown state, the main walls were of coarse local marble, the superstructure and vaulting of brick (Pl. 29, D, part of the main *calidarium*). The entrance from the *Arkadiane*, with a curvilinear, porticoed forecourt leading to a basilical (?) ' atrium', is an addition of the time of Constantius, after whom the baths were renamed *Thermae Constantinae.* The brickwork illustrated in Pl. 29, E, is that of the west wall of the added atrium (5 courses to 34 cm.). It is noteworthy that, at this late date, the brickwork of Ephesus still retains the characteristics and general proportions of its second-century predecessors (cf. that of the baptistry of the Council Church, bricks 34-5 cm. square by 5 cm., 5 courses to 41-43 cm.).

(*d*) The Theatre Baths and Gymnasium.

ÖJh., xxv, 1929, Beibl. 42-5; xxvi, 1930, Beibl. 18-29; xxvii, 16-25, with plan complete as far as excavated, Abb. 2. *Führer*, pp. 62-3.

Not completely excavated; ascribed, on the evidence of the architectural ornament,

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Bamberg

to the Severan period. The visible remains seem to show that the superstructure (see notably *ÖJh.*, xxvi, Beibl. Abb. 10) was almost entirely of brick.

(*e*) The Aqueduct of C. Sextilius Pollio.

Forschungen, vol. iii, 1923, pp. 256-63. *Führer*, pp. 95-6.

A.D. 4-14; one of the earliest attested uses of mortared rubble. The arches themselves are of fine ashlar masonry but the approaches and the specus are of mortared rubble faced with small, well-coursed blocks.

(*f*) The Stadium. Pl. 29, B, C.

Führer, pp. 46-8.

Built in its present form during the reign of Nero; the façade rebuilt in the late third or fourth century. The illustrations show the substructures of the seating along the north side (Pl. 29, C; mortared rubble fill over a barrel-vaulted corridor; on the extreme left the inner face of the outer wall, of fine bossed ashlar) and the substructures behind the façade at the south-west angle (Pl. 29, B; mortared rubble incorporating, top left, a brick arch).

ERZIN (Epiphaneia?), Cilicia. Pl. 24, C.

Unpublished.

The surviving remains are almost exclusively those of buildings of mortared rubblework, characterized by the use of a very distinctive local stone, a refractory, black volcanic rock. In the example illustrated, one of the piers of the aqueduct, the facing blocks are unusually large, giving a superficial impression of cut-stone masonry. Elsewhere the facing is either of smaller squared courses or else resembles *opus incertum*, with a superficial use of brick for bonding-courses and for arches or apses. A typical building (bath-building?) to the south-west of the Theatre has the outer wall-surfaces of coursed, squared stone, the inner surfaces of stone and brick in various combinations (bricks deep red, 29 cm. square by 4-4·5 cm.; 5 courses to 31 cm.); none of the brick courses runs through, but every fourth or fifth course is set more deeply into the core. The only surviving trace of vaulting is of brick.

KORYKOS (Cilicia). Bath-buildings. Pl. 24, A, B.

These buildings, which do not seem to have been considered by Herzfeld and Guyer (*Monumenta Asiae Minoris Antiqua*, vol. ii, 1930: *Meriamlik und Korykos*), lie between the present-day road and the sea, to the east of the Castle (*ibid.*, plan at p. 90, to the west of the 'Large Cistern').

The upper group ('Antike Gebäude'), identifiable as baths by the presence of an adjoining cistern and by the incorporation of ducts and of roof-tanks lined in *opus signinum*, contains work of several periods, but appears basically to have been a structure of concrete, with certain features in ashlar. The mortar has the consistency and properties of Roman concrete, and the core is brought to a face by means of small, irregularly shaped blocks of stone used as in Roman *opus incertum*. At one point there is a flat arch of brick, with a relieving arch over it.

The main surviving structure of the lower, and better-preserved, group ('Antike Bad') consists of three large, parallel, rectangular halls, one of them with an apse and all three barrel-vaulted. The quality of the concrete can be judged from the size of the blocks that have fallen intact (the fallen chunk of masonry visible in Pl. 24, B, measures approx. 5 × 3 × 3 m.). It is faced with small blocks of limestone, coursed but not squared, and there was considerable use of brick (in two sizes, 29 cm. square by 5 cm. and 57-58 cm. square by 6 cm., based presumably on the standard Roman dimensions) for such features as the intrados of the semidome (Pl. 24, A). Use was also made of a porous brown limestone to lighten the mass of the vaults, cf. the Reticulate Baths at Eleusa-Sebaste.

MILETUS

(*a*) The Baths of Cn. Vergilius Capito. Pl. 28, C, D.

Milet: Ergebnisse der Ausgrabungen und Untersuchungen seit dem Jahre 1899, ed. Th. Wiegand, vol. i, 9, 1938: A. von Gerkan and F. Krischen, *Thermen und Palestren*, pp. 23-49 (buildings), 158-9 (date).

Built by Cn. Vergilius Capito. temp. Claudius. Characterized by the massive use of cut stone (as in the semidome of the small apse illustrated in Pl. 28, D) in conjunction with mortared rubble, both (owing to the nature of the local stone) rather coarse. Note the change in character of the masonry of the circular room (Pl. 28, E) just above the springing-line of the dome; the extrados of this dome was exposed. Several of the semidomes (not illustrated) consist of a very deep outer ring of voussoirs, with spherically curved intrados, and the remaining intrados of mortared rubble. There is no structural use of brick.

(*b*) The Humeitepe Baths. Pl. 27, A.

Ibid., pp. 126-42.

Not dated epigraphically, but ascribed on the evidence of the remains to the turn of the first and second centuries A.D. Plate 27, A, illustrates a characteristic example of masonry, including a section through a wall identical in construction with that visible in elevation to right and left of it. There are traces of barrel vaults carried out wholly or partly in brick.

(*c*) The Faustina Baths. Pls. 26, E, and 28, B.

Ibid., pp. 50-94 (buildings), 164-6 (date).

Named after Faustina (probably the Younger), and restored in the second half of the third century, after damage due probably to the Gothic incursion of 263. The illustrations show typical barrel-vaulting (*a*) in two qualities of radially laid stone (Pl. 28, B) with an outer ring of massive stone voussoirs in one of the lateral exedras of the main *caldarium*, the main vaults of which were of brick; and (*b*) in brick (Pl. 26, E) in one of the smaller rooms.

(*d*) Nymphaeum and aqueduct. Pl. 28, E.

Ibid., vol. i, 5, 1949: J. Hülsen, *Das Nymphaeum.*

Put up in honour of M. Ulpius Traianus, proconsul of Asia in 79-80 and father of the emperor; from the form of the inscription it probably dates from the reign of the latter. The aqueduct (Pl. 28, E) is an integral part of the construction. The internal vaults of the Nymphaeum itself are of radially laid rubblework, with a 'keystone' band of courses of specially selected, long, flat slabs along the crown.

(*e*) The Heroon. Pl. 28, A.

There does not seem to be any substantial publication of this unusual building. It is probably of second-century date, and may well have been vaulted in brick.

NICAEA (Iznik). The City Walls. Pl. 31, B, C, D.

Well published by A. M. Schneider and W. Karnapp, *Die Stadtmauer von Iznik* (*Nicaea*) (Istanbuler Forschungen, 9), Berlin, 1938.

For details of the masonry, see p. 86 f. Plate 31, B, illustrates a stretch of curtain wall and one of the original towers immediately to the east of the South Gate; Pl. 31, C, D, the junction of the adjoining stretch of wall with one of the towers that were added in the second structural period, probably in the later fourth century. The facing of these second-period towers is built of a very thin brick (av. 3 cm. wide) laid to a very wide joint (10 courses to 90-92 cm.), but in other respects the workmanship closely resembles that of the first period.

NICOMEDIA (Izmit).

Very little has been recorded about the ancient remains of this important city, for a short time Diocletian's capital. For an account of buildings uncovered and destroyed during building operations undertaken on the western outskirts of the ancient city, see R. Naumann in *Archäologischer Anzeiger*, 1939, *c.* 156-171, with previous bibliography. Two interesting facts emerge from this brief account: (*a*) the substantial use of *opus quadratum* in a large bath-building; (*b*) the very tough quality of the concrete walls or foundations, of a large building at or near the water's edge; as observed in the harbour walls of Elaeusa (p. 96), and at Constantinople itself, in the second sea-wall on the site of the 'House of Justinian', eastern architects, both in Roman and Byzantine times, were perfectly capable of producing the equivalent of a true Roman concrete, whenever circumstances demanded exceptional strength. A third group of buildings, domestic in character, appears to have been built in mortared rubble; but the report is not explicit on this point.

PERGAMON

(*a*) Amphitheatre. Pl. 27, B.

Not excavated; from the character of the masonry it dates probably from the second century A.D. The illustration shows one of the radial walls near its outer extremity, where the facing of small blocks gives way to ashlar. Note that the latter, which is used with metal cramps, still follows the Hellenistic tradition of alternate tall and short courses.

(*b*) Gymnasium. Pl. 27, D, E.

Alterthümer von Pergamon, vol. vi: Paul Schazmann, *Das Gymnasion: Der Tempelbezirk der Hera Basileia.*

A complex group of buildings, of many periods. The examples illustrated come from the north side of the upper gymnasium and show details of the Theatre (Pl. 27, D) and of the 'Kaisersaal' (Pl. 27, E), both of Hadrianic date. Similar masonry techniques are already evident in the earlier (mid-first-century?) West Baths.

(*c*) The Asklepieion. Pl. 27, C.

Th. Wiegand, 'Zweiter Bericht über die Ausgrabungen in Pergamon, 1928-32: das Asklepieion', *Abhandlungen der deutschen Akademie der Wissenschaften zu Berlin*, 1932: *Phil. hist. Klasse*, 5. O. Deubner, *Das Asklepieion: Kurze vorlaufige Beschreibung*, Berlin, 1938.

For the temple of Asklepios Soter, see p. 89. The illustration (Pl. 27, C) shows a detail of the masonry of the adjoining, partly subterranean rotunda, which was added soon after the construction of the main temple.

(*d*) The Serapaeum (Kizil Avlu). Pl. 30.

The only substantial publication remains that of Charles Texier, *Les Ruines de l'Asie Mineure*, vol. ii, pls. 118-19. A very brief account of the German excavations undertaken shortly before the war appears in *Bericht über den VI. Internationalen Kongress für Archäologie*, 1939 (Berlin, 1940), pp. 477-8.

For details of the brickwork, see p. 85. Many of the secondary structures, including the two rotundas, are built of mortared rubble with cut-stone details, very similar to that of the second-century Gymnasium.

PERGE (Pamphylia). Bath-buildings.

Briefly described in K. Lanckoronski, *Städte Pamphyliens und Pisidiens*, Vienna, 1890, vol. i, pp. 45-6.

Both in the bath-buildings by the West Gate and in those near the south-west angle of the city (Lanckoronski, fig. 26, O_I and O_{II}) the main rooms had barrel vaults of brick springing from shelf-like set-backs in the two long walls. Other brick features in the same buildings appear to belong to later reconstructions. The individual bricks measure 27-28 cm. by 4·5 cm.

(4) MATERIALS AND THE HISTORICAL DEVELOPMENT OF BYZANTINE ARCHITECTURE

The most important single conclusion to be drawn from the brief survey undertaken in the previous section is unquestionably the fact that, without exception, the building techniques used in early Constantinople can be shown to be derived from practices that were already current locally at the beginning of the fourth century, when the city was founded.

Not all of these practices were of equal antiquity. Dressed stone, which had behind it the longest history of continuous local usage, was already verging on obsolescence and was, before long, to disappear from the Byzantine repertory. Coursed rubblework, too, had a respectable local ancestry, although it was in a relatively recent form, alternating with strengthening courses of brickwork, that it makes its most characteristic appearance in Byzantine architecture. This increasing use of Roman-type brick was typical of the later Imperial architecture of the Northern Aegean provinces, and was perhaps its most significant innovation. Used with rubblework, at first only for bonding courses and for the frames of doors and windows, it tended increasingly to spread all over the face of the remaining masonry mass, as we find it already in the towers of the city walls of Nicaea (p. 86) or in the interior of St. George's at Salonica (p. 88). Quite distinct from this, but tending towards the same goal, was the introduction of solid brickwork, as in the Serapaeum at Pergamon or the aqueduct at Aspendos (p. 85). Yet another parallel development was the increasing use of brick for vaulting in forms which, as at Aspendos and at Salonica (pp. 96, 89), unmistakably foreshadow Byzantine practice. All of these were features that were to find full expression at a later date. But it was in the second and third centuries that they enter the local repertory.

How far what is true of building practices may be true also in other related fields is a question that lies outside the scope of the present study. In this particular respect, however, there can clearly be little sense in the enquiry whether the architecture of Constantinople belongs to the East or to the West: in its building materials and practices it is essentially a local growth, the product of conditions already established in the third century in the area of which Constantinople is the natural centre. The remoter origins of much of this must, it is true, be sought elsewhere. Kiln-baked brick, for example, seems to have been an intruder from Italy; pitched-brick vaulting is almost certainly derivative ultimately from the ancient East. Ashlar masonry, on the other hand, was essentially a local tradition, and although mortared rubblework may ultimately derive from Rome, it had at least three centuries of local development behind it when Constantinople was founded. How these various currents met and mingled we can, at present, only discern in very general terms. The various techniques and methods were not developed in isolation, but side by side, in a large number of provincial centres, each of which had its own local materials, its own local traditions; and further research will no doubt clarify, as it will assuredly also modify, much that has been said in the previous section. What would seem to be solidly established is the fact, in this particular aspect of Byzantine architecture, the melting-pot was not Constantinople but the Aegean provinces of the Roman Empire.

Seen in its historical perspective, this would seem to be a very reasonable conclusion. It is not easy for the present-day observer to view the foundation of Constantinople as any but the unique and epoch-making event which, in the result, it turned out to be. And yet to the contemporary observer it must have seemed to be following a pattern that was already very familiar. Within the last few decades new capitals, in several cases amounting virtually to refoundations of ancient cities, had sprung up in half a dozen provinces of the Empire—Trier, Milan, Sirmium, Salonica, Nicomedia, Antioch. All of these, for all that they may have had in common in the field of planning and of architectural ideas, must have been realized very largely, if not entirely, by local architects employing local craftsmen and using local materials. In this, Constantinople was evidently no exception.

Where Constantinople differed from all its predecessors was in the unique and unqualified success that attended the new enterprise. Out of the dust and confusion of the third and early fourth centuries there emerged a new pattern, a pattern which was to influence every aspect of human thought and activity, and which inevitably found expression also in the architecture of the new age. One of the vital new elements in this pattern was the formal adoption of Christianity as the State religion, an innovation of incalculable importance for the future of European architecture. Another and in the long run scarcely less important event was the division of the

Empire into East and West, followed closely by the collapse of Roman rule in large parts of what had been the Roman Empire. The classical world was breaking up. Constantinople had been founded at the end of a long period during which the whole tendency of the age had been towards an ever-increasing unity of culture and ideals. It was to develop in an age that was moving steadily in the reverse direction.

One of the consequences of the shrinking of the frontiers, both spiritual and physical, was to drive the several regions of the Empire increasingly in upon their own resources. Constantinople was no exception. As the circle drew narrower and the possibilities of fruitful exchange grew steadily less, Byzantine civilization had more and more to draw upon and to develop its initial inheritance. In an essentially conservative field such as that of building techniques and methods, the result was that which we have already seen in the earlier part of this chapter. There was development; but it was development within a strictly limited circle of ideas, and those ideas were almost exclusively what had been inherited from the previous age.

What, in practical terms, was the result of all this upon the development of Byzantine architecture? Constantinople had been founded to be the new Rome, and the architecture of the new Rome might be expected to have taken up where the old Rome had left off. A good case can, in fact, be made out to show that this is just what it did. If Hagia Sophia is rightly to be regarded as the culminating achievement of early Byzantine architecture, it is very hard to disagree with those who maintain that Constantinople inherited and developed the concepts of space which are characteristic of (and in this age unique to) the concrete-vaulted architecture of the Roman West, and which are Rome's great and abiding contribution to the architectural thinking of subsequent generations. And yet, the more one studies Hagia Sophia, the more one is driven to conclude that, in a sense, it lies off the main stream of Byzantine development. It is in essence a concrete building translated into brick, a supreme *tour de force* rather than the expression of a consistent architectural tradition. It may very well have had predecessors in Constantinople; but it had, and could have, no successors. In this respect, at any rate, it is not altogether unfair to term it the last great building of Roman antiquity.

The main stream of Byzantine architectural development lay elsewhere; and although it would be an exaggeration to claim that the available building materials and techniques were in themselves sufficient to determine its course, they were undoubtedly an important contributory factor in shaping the finished product. Roman monumental architecture, with its soaring vaults and elusive vistas, would have been impossible without the use of good Roman concrete. Byzantine architects had, instead, to adapt their ideas to what could be done in brick. Vaulting in brick, to be generally applicable, has to follow certain simple geometrical shapes —the barrel vault, the simple cross-vault, and the dome; and it is no accident that it is precisely these forms that are characteristic of Byzantine architecture for over a millenium.

There were assuredly other factors, too, that determined the selection of these particular building forms. The dome in particular, as a symbol both of earthly and of heavenly majesty, was an obvious choice for the architects of the new religion, in search of a fitting type of building in which to house the ceremonials of Christ the King and of His representatives upon earth. Again, the simple geometrical forms of barrel vault and dome lent themselves admirably to the rationality of planning which was Byzantium's inheritance from Greece, an attitude of mind which found ideal expression in that most characteristic of Byzantine buildings, the cross-in-square church. One has only to contrast the soaring vistas of a building such as the Baths of Diocletian with the ordered logic of one of these cross-in-square churches to grasp the measure of the difference between the Roman and the Byzantine architectural ideals. For a time the two existed side by side, in fruitful partnership, a partnership of which Hagia Sophia and San Vitale are the last and greatest expressions. In the end, however, it was the simpler tradition that triumphed; and a modest but vital share in that triumph must be ascribed to the Byzantine mason and to the materials in which he worked.

J. B. W. P.

CHAPTER IV

THE BRICK STAMPS

ONLY a small number of stamped bricks were unearthed during the excavations, but all are important, for they were mostly found *in situ* and are hence significant for purposes of dating. They are listed below in an order which is, as far as can be ascertained, chronological.

Only one of these stamps (no. 1) belongs to the common group beginning with the letters ΙΝΔ, thus indicating either a date or number. At one time it was considered that the reference was to the imperial indictions, but as the names that follow are not always imperial, this theory is now discounted, and it is more or less generally agreed that the name is probably that of a contractor or factory and that the count refers to the issue of bricks rather than to a date.[1] The stamp is unfortunately not very clear, and the name cannot be made out. The shape of the stamp is, however, distinctive; it is closer to that found on Roman bricks than are any of the others, and this tallies with the location of its discovery in one of the earliest sections of the building complex.

Of the other stamps, two bear names followed by titles (nos. 7 and 8). The first title is easy to read, namely πρεσβύτερος; the other, of which there are variants, is harder to decipher; the word is perhaps κύριος. These stamps thus fall into the second of five groups distinguished by Mango.[2] The remainder bear names, one (no. 4) in the nominative, followed by an abbreviation sign, S, and the others (nos. 5 and 6) in the genitive. The monogram (no. 3) is merely a variant of the stamp with the same name, ΓΑΙΟϒ, written in a straightforward manner. The name of no. 4 is so common that it cannot refer to the emperor, as has sometimes been held; nor are the other names likely to be imperial. More significant is the form of the stamps, and it may be stated with some confidence that the long single-lined stamp (no. 1) is the earliest form; the smaller single-line stamp or the monogram (nos. 2 and 3) are also early, and here the bricks are certainly to be assigned to before the year 450; the double-line stamps are later in date, and would seem to have come into fashion with the later fifth or sixth century. It may also be suggested that the single names are perhaps earlier than names accompanied by a designation. In any case that sequence seems to be true of the parts of the Great Palace area that have been excavated. But on the basis of these and other finds it does not seem possible to draw any conclusions as to date from the presence or absence of prefixes such as ΙΝΔ or ΒΑ.[1]

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[1] See C. A. Mango, 'Byzantine brick stamps', *American Journal of Archaeology*, 54, 1950, p. 19, and E. Mamboury, 'Une nouvelle lecture raisonnée des inscriptions de briques byzantines', *Byzantion*, xix, 1949, p. 113. The former gives a full bibliography.

[2] *Loc. cit.*, p. 24.

CATALOGUE (See Fig. 21).

1. ΙΝΔ $\frac{\Omega}{\Omega}$ ΣΙΛΑ Bricks 35 × 35 × 5. One *in situ* in brickwork repairs to the stone arch. Another, fragmentary, in filling near by. Both very poor impressions.

A stamp of the same shape and size, but with a different inscription, was found in excavations on the Serail point;[2] another closely similar appears on a brick *in situ* in the north wall of the Bin-bir-derek cistern;[3] a third from the site of the new university near Bayazid is published by Maletskos.[4]

Date. Probably fourth century.

2. +ΓΑΙΟΥ. Bricks hard and well baked. 34 × 34 × 4. Numerous examples *in situ*, in building below the south-west portico (p. 15).

No stamp of exactly similar type has been recorded, though the name, spelt differently, is known on quite a number of stamps. It thus appears in the form +ΓΑ+ ΙΟΥ+ on bricks *in situ* in the palace of the Magnaura, and on stray bricks found in the excavations between St. Eirene and Hagia Sophia in the form +ΓΑ ΕΙΟΥ.[5] The same stamp was found on bricks in the north court of Hagia Sophia, and a stamp reading ΓΑΙΟΥ is recorded *in situ* on the stairs in Hagia Sophia, where it appears to belong to Justinian's building.[6] It may well have been re-used.

Date. The two-line variant would appear to be mid sixth century. The single-line stamp reading ΓΑΙΟC is probably of the fourth or early fifth century.

3. Monogram, to be read as no. 2. The bricks are indistinguishable from those bearing stamp 2 and were used indiscriminately in the same wall.

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[1] On the significance of the prefix ΒΑ see E. Mamboury, *loc. cit.* He discards the interpretation βασιλέως and suggests βαρέσαντος, 'stamped'. Mango objects that the word βαρέω, 'to stamp', is a modern colloquialism, not known in Classical or Byzantine Greek. But if the stamping was done in a brickworks, it seems possible that a colloquialism might have been adopted and that it is merely by chance that we do not know of the word's early usage.

[2] *Arch. Anz.*, 1916, p. 18, Nos. 6 and 7.

[3] Wulzinger, *Byzantinische Baudenkmäler*, p. 41.

[4] *Α. Μ. ΜΑΛΕΤΣΚΟΥ*, "Ἡ ἔννοια τῶν ἐνεπιγράφων βυζαντινῶν πλίνθων", in *Proceedings of the Ninth International Congress of Byzantine Studies at Salonica*, Athens, 1955, p. 271 and pl. 54, 2.

[5] I am indebted to the late M. Ernest Mamboury for bringing these bricks to my notice.

[6] B. Gray, in *Second Report upon Excavations in the Hippodrome*, p. 51, n. 1.

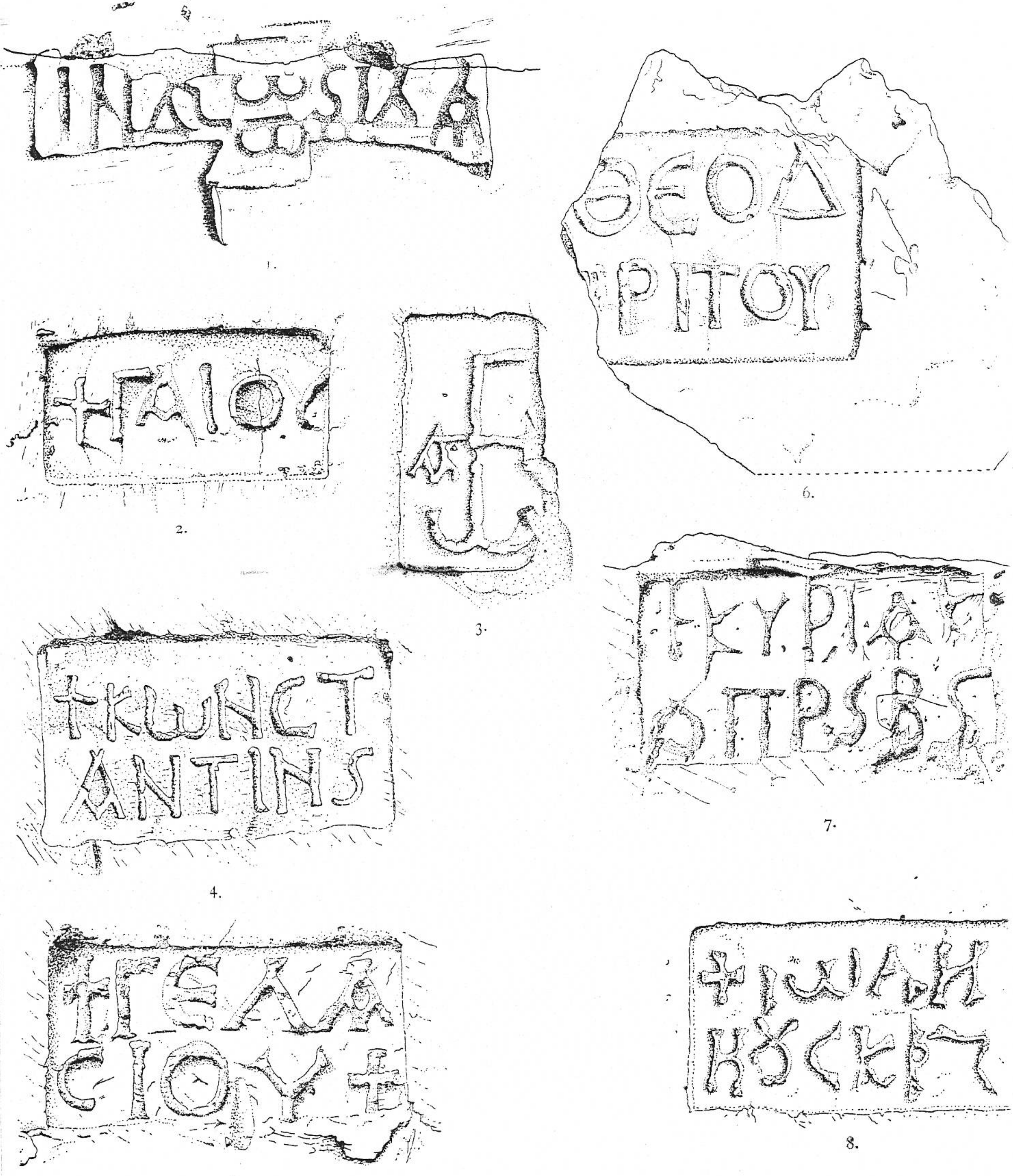
1.
+ΓΑΙΟϹ
2.
3.
+ΚWΝCΤ
ΑΝΤΙΝS
4.
+ΓΕΛΑ
ϹΙΟΥ+
5.
ΘΕΟΔ
ΡΙΤΟΥ
6.
7.
8.

FIG. 21. The Brick Stamps.

Monograms with the same name, but of slightly different type, appear on bricks from a number of sites, notably St. Eirene,[1] and in the recent excavation between St. Eirene and Hagia Sophia.[2] They take the form $\Gamma\overset{ȣ}{\underset{\mathrm{E}}{+}}\mathrm{A}$ and should probably be read as ΓΑΕΙȣ, though the direction of interpretation is not the same as that on the stamp from the south-west portico, where it follows a different course. This is a much less usual disposition in the reading of monograms; perhaps at an early date the art of devising them had not developed as far as it did later on. The decipherment is, however, certain in view of the presence of bricks with stamp no. 2 in the same wall. The bricks from between St. Eirene and Hagia Sophia are, according to M. Mamboury, to be dated to the sixth century. The name is probably that of a brickmaker. An interesting inscription appearing on two bricks from the Forum of Constantine suggests that he sometimes numbered his bricks; it reads *Γαείου ἐνδικτιοῦνος β′*.[3] In spite of the mis-spelling the meaning is clear; it must refer to some sort of count of the bricks.

Date. As no. 2.

4. ΚΩΝCΤΑΝΤΙΝΣ. Bricks 35 × 33 × 5.

A large number of bricks bearing this stamp were found in the filling, as well as *in situ*, in the vaulted structure beside the great stone wall (see p. 48).

A similar stamp was found in the Mangana area[4]; otherwise it is less common than the variants ΚΩΝCΤΑΝΣ or ΚΟCΤΑΝ, which are very common in the Hagia Sophia area.[5]

Date. Sixth century?

5. ΓΕΛΑCΙΟΥ +. Bricks 37 × 36 × 6·5. *In situ* on fallen vault, close to stone structure of the Apsed Hall (see p. 42)

Date. Probably sixth century.

6. (+)ΘΕΟΔ(Ω)ΡΙΤΟΥ. A few fragments only from the filling, close to great stone wall (p. 36).

Date. Probably sixth century.

7. + ΚΥΡΙΑΚ
Ο ΠΡΣΒΣ. Bricks 35 × 34 × 3·8. The inscription is to be read: ΚΥΡΙΑΚΟΣ Ο ΠΡΕΣΒΥΤΕΡΟΣ. *In situ*, on fallen vault, close to stone wall (see p. 42).

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[1] W. S. George, *The Church of St. Eirene at Constantinople*, p. 60 and pl. 16.

[2] Still unpublished.

[3] I have to thank M. E. Mamboury for this information.

[4] Mamboury-Wiegand, p. 38.

[5] E. H. Swift, *Hagia Sophia*, 1940, p. 50.

A similar stamp was found in the Bucoleon area, though not *in situ*,[1] and it appeared again *in situ* on pier no. 7 of the 'North-West building' beside the Peristyle court.[2] The excavators dated this to the time of Justinian.

Date. Probably sixth century.

8. ΙΩΑΝΝȣCΚΡΙ. Bricks 35 × 33 × 4 and 36 × 36 × 5·5. The inscription is probably to be read ΙΩΑΝΝΗC ΚUΡΙΟΣ. A large number of examples, *in situ*, in the vaulted structure outside the great apsed building (see no. 4, p. 44).

Bricks with the same stamp were also found in the conduit close to the north-east end of the north-west portico, though they were probably re-used there (see p. 7).

Date. Probably sixth century.

D. T. R.

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[1] Mamboury-Wiegand, *op. cit.*, p. 12.

[2] *G.P.*, pl. 14, no. 76. See also p. 27 for dating.

CHAPTER V

THE BYZANTINE POTTERY

IN none of the seasons since the war have the pottery finds been either very extensive or very important, and with the exception of two sealed deposits, they have been confined to stray fragments of no archaeological significance. Of the two deposits, one took the form of a well, which had been cut through the mosaic and through the floor of the earlier building below the mosaic floor on the south-west side of the Peristyle (p. 15); the other was inside the great apsed structure at the chord of the apse, above a deposit of bricks and building rubbish belonging to the first ruin of the site (Fig. 12), below the foundations of the boundary wall of the present upper terrace, which must have been built in quite early Turkish times (see section, Folder B). Both deposits therefore belong to a period when the palace was already abandoned, and are therefore important in determining when this abandonment took place.

The types of pottery were similar in both these deposits. They were confined in the main to plain unglazed wares, to plain glazed and painted wares, and to incised and fine sgraffito wares. Nothing was in fact found which would not, on Stevenson's classification, have fallen into his Stage V or been of the types associated with the twelfth century (*G.P.*, p. 54).

The fragments from the two sealed deposits will be dealt with first; a few other pieces, which are of interest on their own account, will then be described.

Well on South-West Side of Peristyle (Fig. 7).

Pottery from the well was all of a utilitarian character, and the fragments must either have fallen or been thrown into the well in the course of everyday use. Unglazed jugs or pitchers constituted about seventy-five per cent. of the finds; late painted ware (Group B.4)[1] came next, represented by about ten per cent. of the finds. Plain glazed wares (Group A.3) constituted another eight per cent., while there were a few pieces each of incised ware (Group B.2) and sgraffito ware of the Sparta I type (Group B.1). Quite a number of the fragments were well enough preserved to permit a reconstruction of their forms. The more important examples are illustrated.

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[1] The classes are throughout those distinguished in my *Byzantine Glazed Pottery*, Oxford, 1930.

(a) *Unglazed Wares.* Handled jug (Fig. 22, A); there were numerous fragments of similar jugs. Handled bowl (Fig. 22, B). Upper portion of beaker (Fig. 22, C). Large beaker or jug, outer surface ribbed (Fig. 22, D); there were numerous fragments of similar beakers. Portion of large water-jug, with band ornament at the shoulder (Fig. 22, E); there were numerous fragments of similar jugs. Base of large dish, coarsely made (Fig. 22, F). Wide-necked, two-handled water-pot (Fig. 24, D); there were fragments of several similar pots. Top of large two-handled water-pot (Fig. 24, E), and numerous fragments of similar vessels.

(b) *Plain Glazed Wares.* Bowl, glazed inside and out in thin, pale cream glaze (Fig. 23, A). Squat jug, inside unglazed, outside with pale green glaze; no slip (Fig. 23, C). Squat jug, with light green glaze over a white slip outside and thin cream glaze inside (Fig. 23, D). Bowl, with thin yellowish-green glaze inside and out (Fig. 23, E).

(c) *Late Painted Ware.* A number of fragments of shallow, saucer-like bowls, with painted designs in brown, manganese and green, showing stylized birds, etc. Most were small; the best belongs to a bowl with a decoration of a debased scroll in green and manganese (Fig. 23, B).

(d) *Late Incised Wares.* A few bases of bowls. Most important were a base on a low ring, with a greenish-cream glaze on a white slip inside and a base with a coarse incised circle cut through a white slip inside.

(e) *Sgraffito Wares; Sparta I Type.* Base of bowl, with decoration of a bird inside (Fig. 25, A).

Midden, Apsed Hall

The greater proportion of fragments from this site—about fifty per cent.—were of late painted wares, which varied from unusually fine examples, including a finely made, two-handled cup, to the usual mass-produced dishes and shallow bowls. Sgraffito wares of the elaborate incised and Sparta I types were next most numerous, comprising roughly thirty per cent. Plain glazed wares and unglazed pottery was less common than in the well. Two coins associated with these finds belonged to Justin I (572-573) and Basil I (*c.* 869-879), but they must have been intrusive, for several small fragments of Islamic pottery of well-known twelfth-century types were also found in the deposit. One of them belonged to a bowl with thick cream glaze and a moulded decoration of kufic script;[1] another was of fine white paste, with a moulded floral decoration and a turquoise blue glaze, of a type associated both with Rakka and Persia.[1] These fragments, together with the evidence afforded by the Byzantine examples,[2] serve to date the midden to the twelfth or early thirteenth century.

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[1] Compare Lane, *Early Islamic Pottery*, pls. 39 and 42.

(a) *Unglazed Wares.* Double-staged lamp (Fig. 24, A). Bowl on high hollow stem (Fig. 24, B). Small beaker (Fig. 24, C).

(b) *Plain Glazed Wares.* A lamp, with yellow glaze over a buff body, no slip (Fig. 27, A); fragments of two similar lamps. Spouted jug, with band decoration at the shoulder and a pale green glaze outside (Fig. 27, D).

(c) *Late Painted Wares.* Portion of bowl, with decoration inside in manganese and green (Fig. 26, A). Portion of bowl, with green speckled decoration inside (Fig. 26, B). Side of shallow dish, with yellow decoration over a white slip, and rough decoration in green (Fig. 26, C). Base of bowl, cream glaze with decoration inside of a bird in blue (Fig. 26, D). Portion of a bowl, cream glaze, with scroll decoration inside in blue (Fig. 26, E). Two-handled cup, with pale cream glaze inside and out (Fig. 26, F). These two constitute unusually fine examples of the painted ware group. Base of bowl, with a bird inside in manganese and green (Fig. 28, G). Base of a small bowl, with a beast like an heraldic dragon in manganese inside the base (Fig. 28, F). This is again an unusually fine example.

(d) *Late Incised Ware.* Small flat-bottomed bowl, with cream and green glazes outside over a white slip, and a yellow glaze over the same slip inside, with decoration in the form of a tree at the base inside (Fig. 27, B). Bowl, with cream glaze on a white slip, and a decoration of two concentric circles around the inside at the base (Fig. 27, F). Base of bowl, on a high ring, with green glaze over a white slip outside and yellow glaze inside, the incised portion black (Fig. 28, D).

(e) *Sgraffito Ware, Sparta I Type.* Fragment of bowl on high ring base (Fig. 25, B). Base of bowl, with eagle (Fig. 25, C). Base of bowl with decoration suggestive of debased kufic (Fig. 25, D).

Stray Finds

A few other fragments may be noted, either because of their interest as examples of Byzantine pottery, or, in a few instances, because of the location of their discovery. Several bases of elaborate incised ware with monograms appeared as strays, notably two with the monogram M I, one with K, and one with three indefinite symbols

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[1] Compare R. L. Hobson, *A Guide to the Islamic Pottery of the Near East, British Museum*, 1932, pl. XVII, for an example of the thirteenth century.

[2] Stevenson, *G.P.*, Stage V, p. 54. The painted ware in the Hippodrome area was mostly dated to Palaeologue times.

(Fig. 28, A, B, C). On the basis of finds made in the Hippodrome, they are all probably to be assigned to the Palaeologue period.[1] The base of a bowl with an animal like a dog (Fig. 28, H) and another with a hare or similar animal (Fig. 28, E), both of incised ware, were found in the filling of the Apsed Building. A fine two-handled cup (Fig. 29, A), with a cream glaze speckled in pale green above a white body, is perhaps a late variant of the best plain glazed wares. It was found in the filling of the great Apsed Building, quite near the surface, in a disturbed stratum, and may belong to any date from the twelfth century onwards. Of similarly indefinite date was a lamp (Fig. 29, B), with pale green glaze over a white slip, on a red body. The ware is of a type found in late Byzantine or early Turkish times, but the form is almost Roman. The lamp is interesting in that similar ones from Byzantine sites are extremely uncommon.

Of the unglazed wares the most interesting find was a portion of a tall flask-like vessel of coarse clay found at a depth of six metres outside the great apsed building (Fig. 27, E). No other finds were associated with this, but the earth had not been disturbed, and a date before the fifth century seems likely. A small vessel shaped like an egg-cup (Fig. 27, G) and a squat cup (Fig. 27, C) may also be noted. They came from debris in the great Apsed Building, just above the midden, and are probably to be dated to the thirteenth or fourteenth century.

A number of fragmentary lamps of the conventional classical form were also found. Only one, a fragment (Fig. 8), came from a sealed deposit, namely the foundation of the building below the south-west portico. The other lamps were all found at various places, in imported filling.

D. T. R.

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[1] *Preliminary Report upon the Excavations carried out in the Hippodrome of Constantinople in 1927*, Oxford, 1928, p.30. See also *Byzantine Glazed Pottery*, p. 76, nos. 24, 28 and the top of 16.

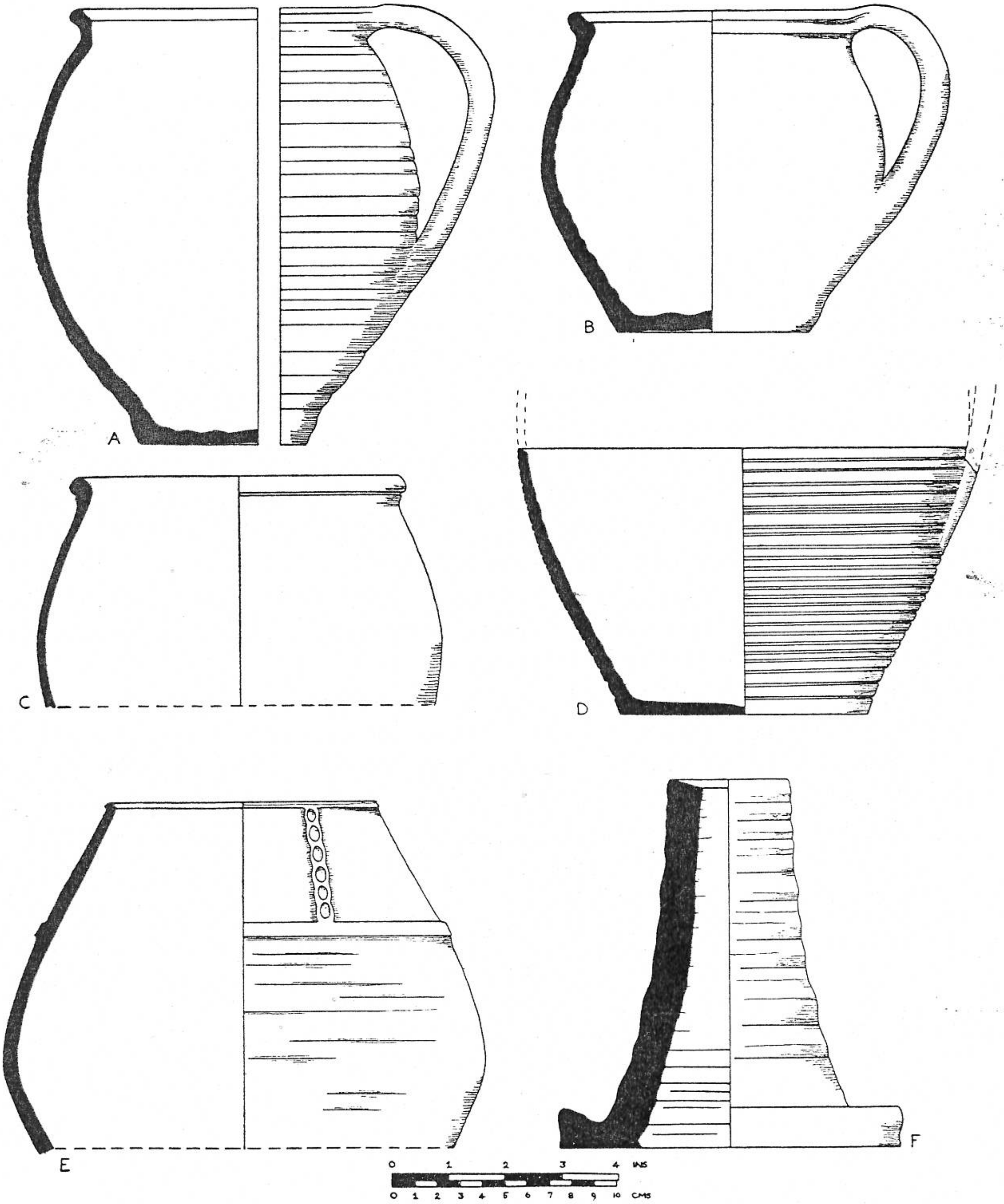
A
B
C
D
E
F
0 1 2 3 4 INS
0 1 2 3 4 5 6 7 8 9 10 CMS

FIG. 22. Byzantine Pottery; unglazed wares, from well below south-west portico.

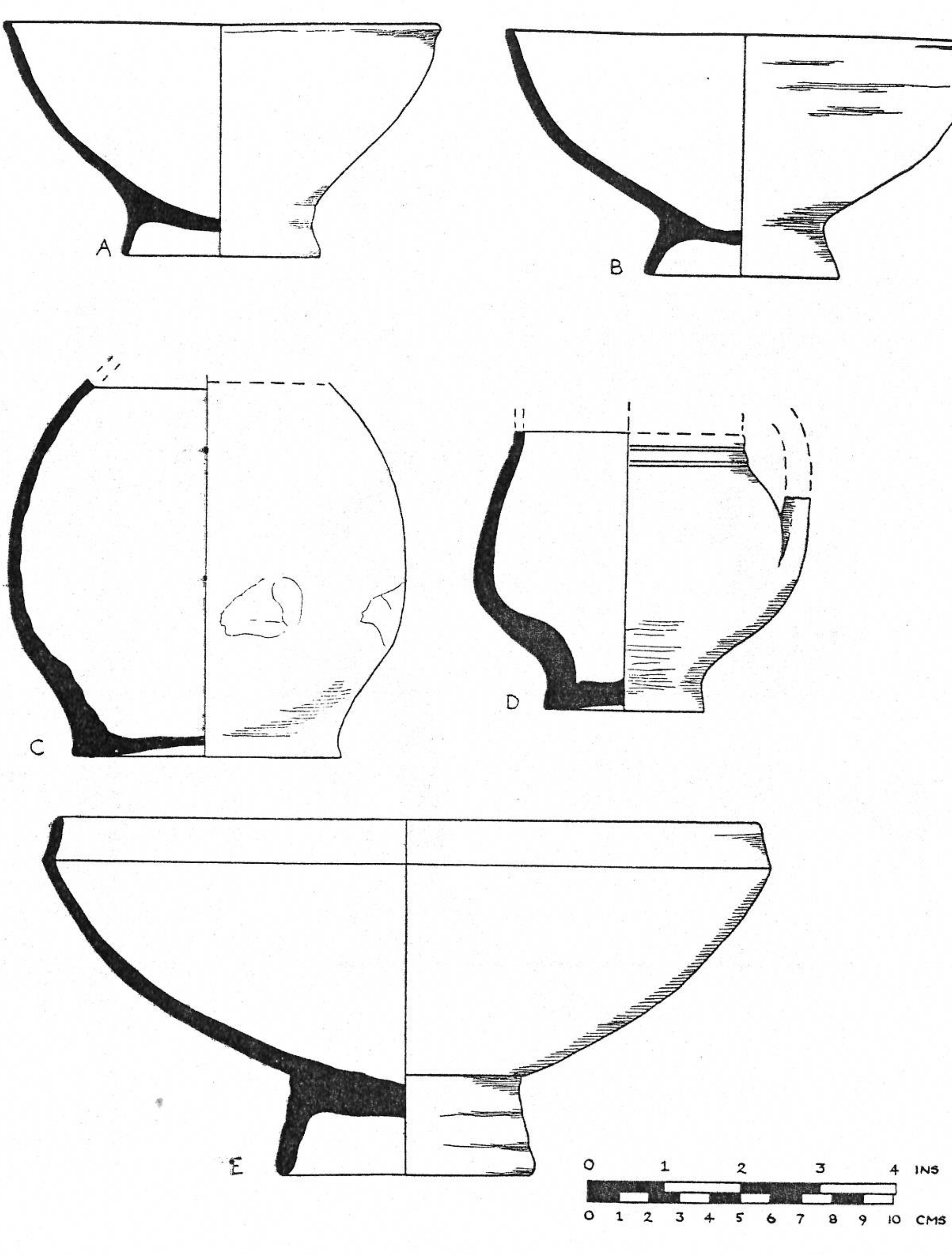
A
B
C
D
E
0 1 2 3 4 INS
0 1 2 3 4 5 6 7 8 9 10 CMS

FIG. 23. Byzantine Pottery; plain glazed wares, from well below south-west portico.

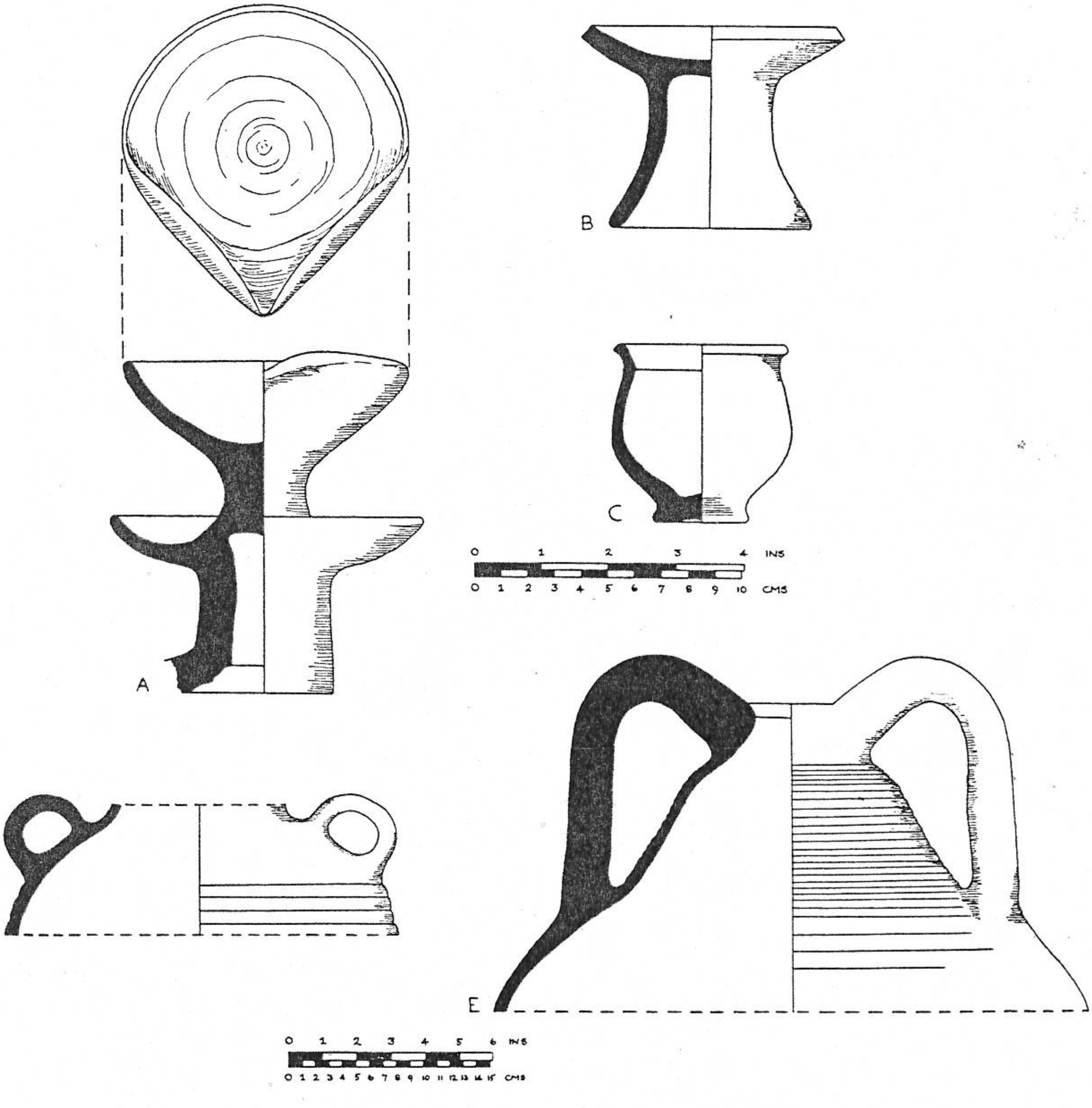
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FIG 24. Byzantine Pottery; unglazed wares.

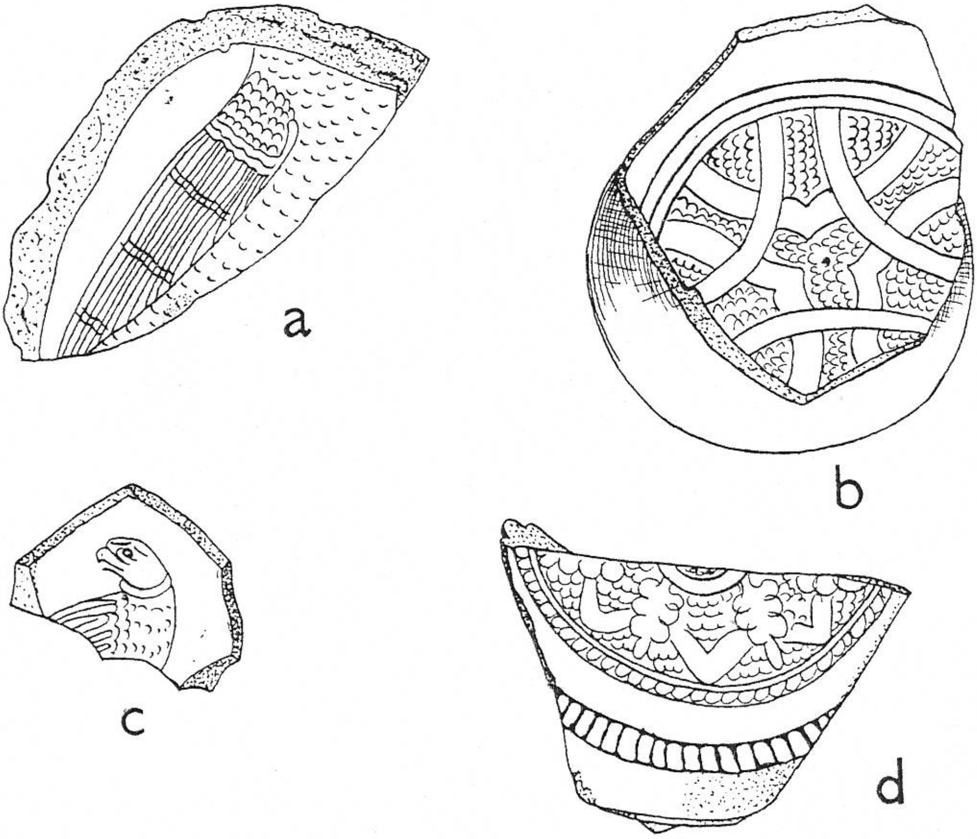

FIG. 25. Byzantine Pottery; Sgraffito ware, bases of bowls.

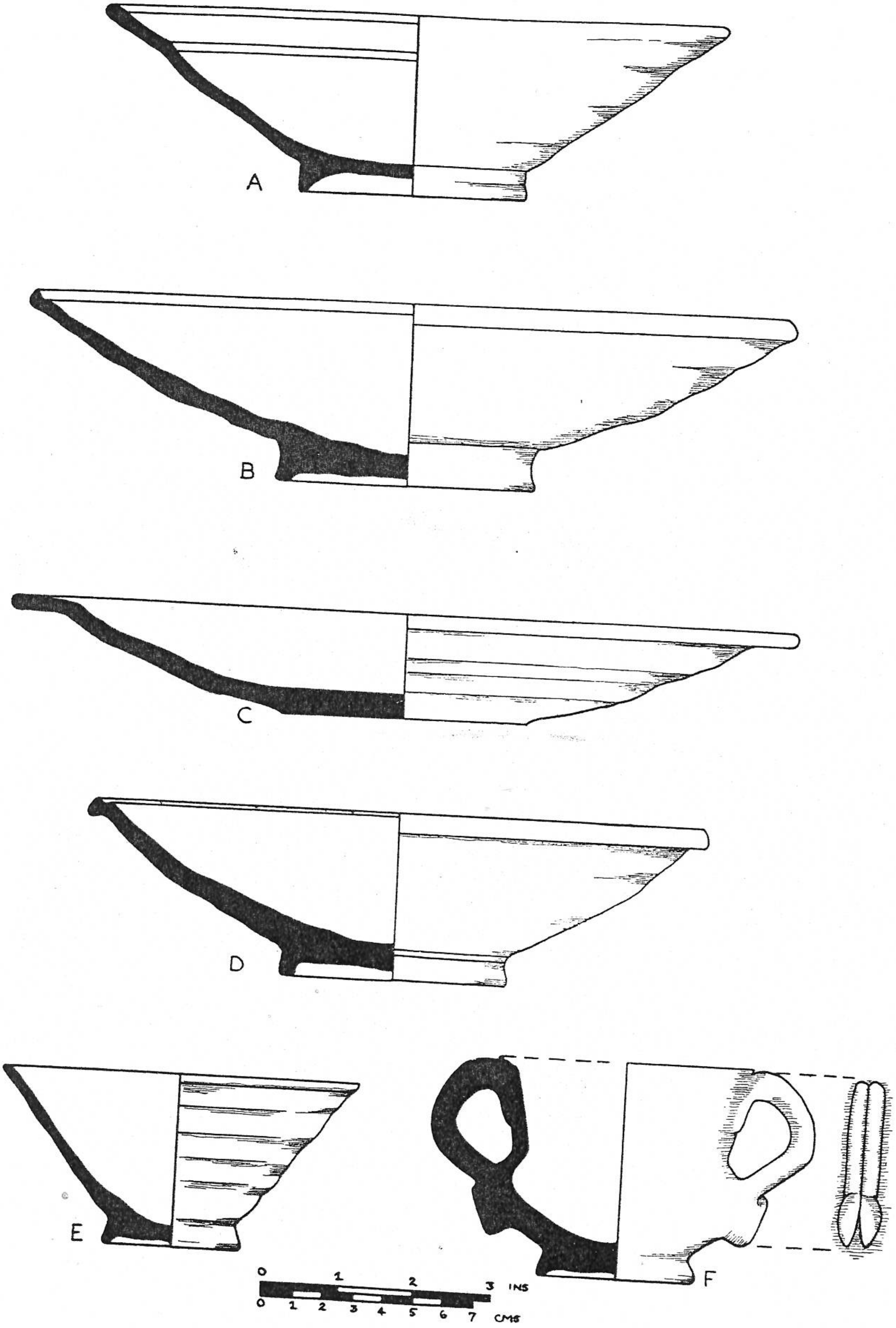
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FIG. 26. Byzantine Pottery; bowls of late painted ware.

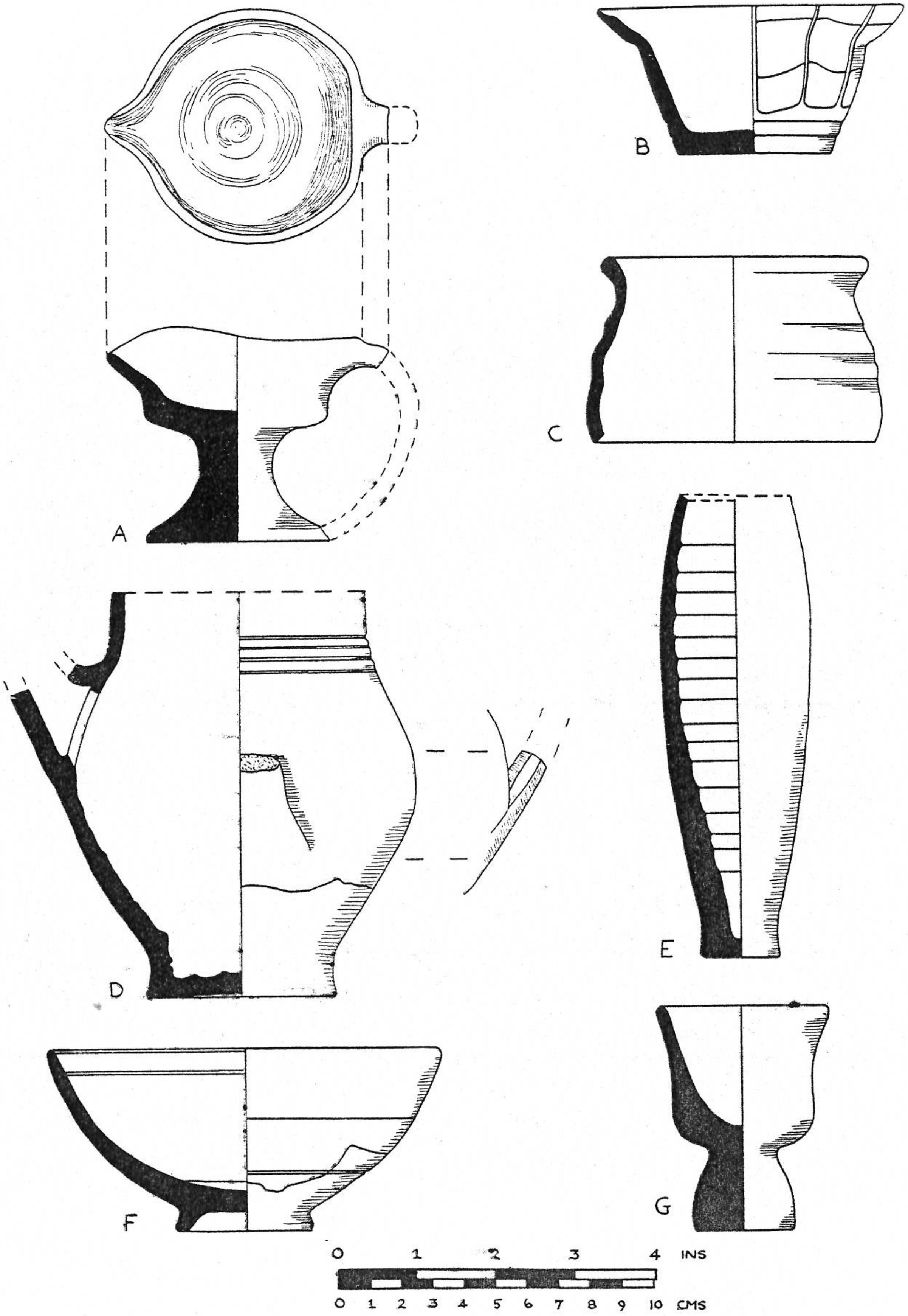
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Fig. 27. Byzantine Pottery; plain glazed and late incised wares.

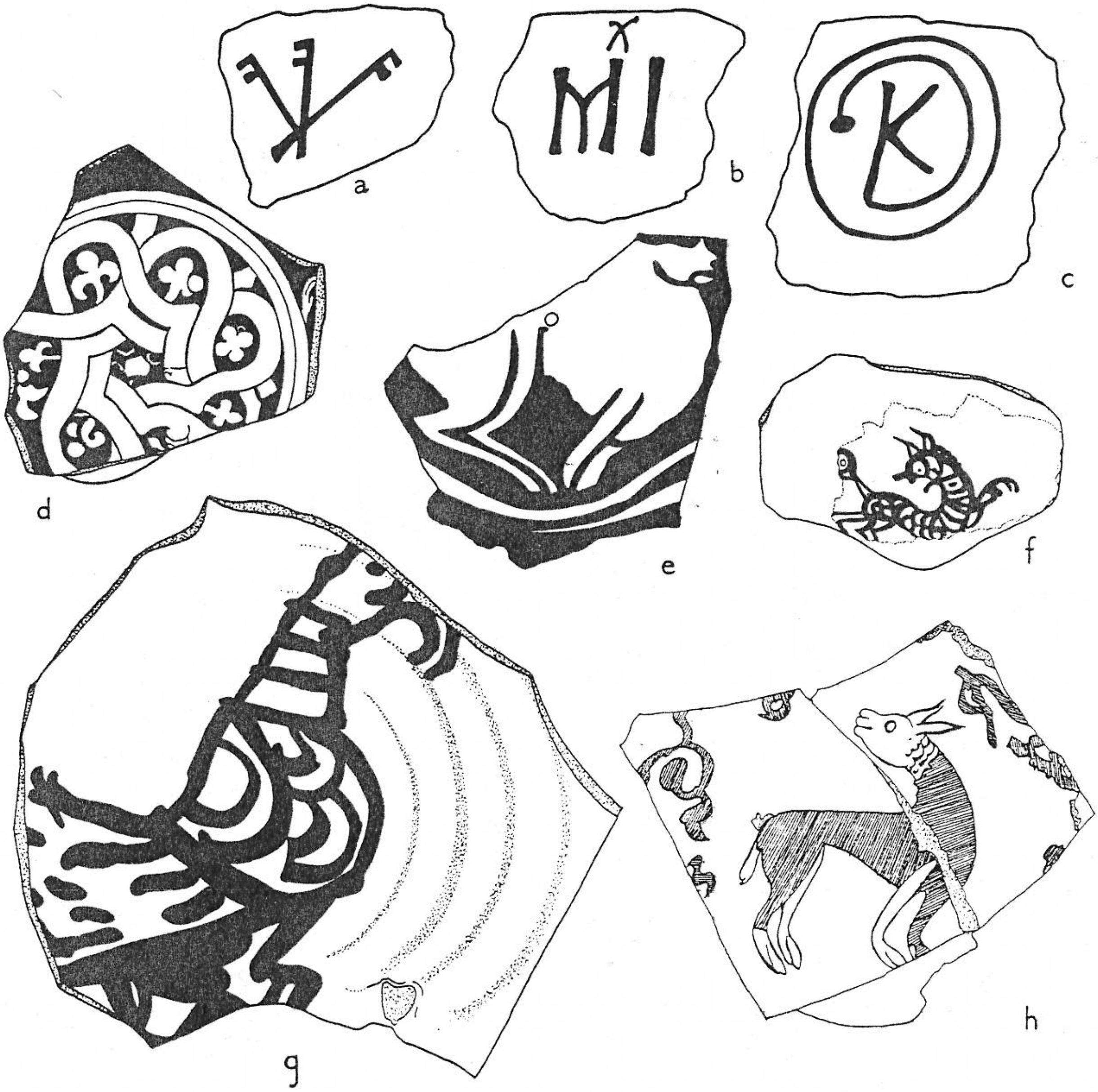

FIG. 28. Byzantine Pottery; bases of bowls; a-e, elaborate incised ware; f, g, painted ware; h, incised ware.

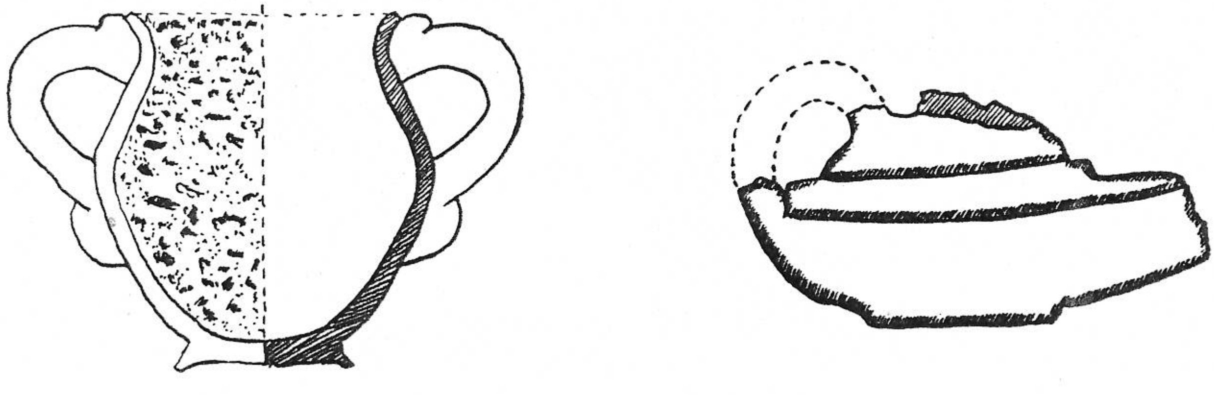

FIG. 29. Byzantine Pottery; A, two-handled cup, plain glazed ware; B, lamp, blue glazed ware.

CHAPTER VI

THE MOSAICS

A. DESCRIPTION OF MOSAICS DISCOVERED IN 1952, 1953 AND 1954

(1) Main Floor

A FURTHER portion of the floor was unearthed in the north-east portico, beyond section D (*G.P.*, plan 60). It comprised a section of the inner border, and figures in three registers. The whole area had suffered from subsidence, and had also been extensively repaired in ancient times in pink plaster. The action of the scenes here moves from left to right, whereas in the adjacent area unearthed before the war it is from right to left. The change of direction corresponds with a change of 'workshop'. The scenes are as follows. Those marked with an asterisk have been lifted and installed in the arcades of the Araste Sokak, for they lay below a street which was in regular use. The over-all disposition of the scenes is shown on Fig. 30.

First Register

1. *A Hunter* (Pl. 44, B). The figure stands next to the armed man fighting a tiger which was unearthed before 1939 (*G.P.*, p. 68, no. 1, and pl. 28). He is running towards the right, but turns his head to look behind him over his left shoulder; his spear is poised to strike backwards. In his left hand he holds a circular shield. He wears buff trousers which reach down to his knees, a tunic of grey and black, and a garment like a waistcoat, of green and yellow; over these is a pink sash at the waist. He also wears stockings of grey which reach up to the knees, shoes of grey and brown, and gartering in black. A straight-hilted sword of Roman type is slung at his left side, its strap passing over his right shoulder. The costume and general appearance of the figure are close to those of another hunter already described by Brett (*G.P.*, no. 45). Not far from the point of the man's spear, and serving to fill the space between this and the next composition, is a small hillock with grass and bushes growing on it.

* 2. *A Tree* (Pl. 45, lower left). Height 1·3 m. The tree probably represents an olive. The trunk is made up of cubes set in parallel vertical lines, the right-hand side being in shade and the left in half-light. At the base the trunk is twelve tesserae in

width, half-way up, nine, and at the springing of the branches, six. At the centre the first two rows on the shaded side are black, the next row brown, the next three grey and the last olive. The leaves are in green, blue and yellow against a black ground.

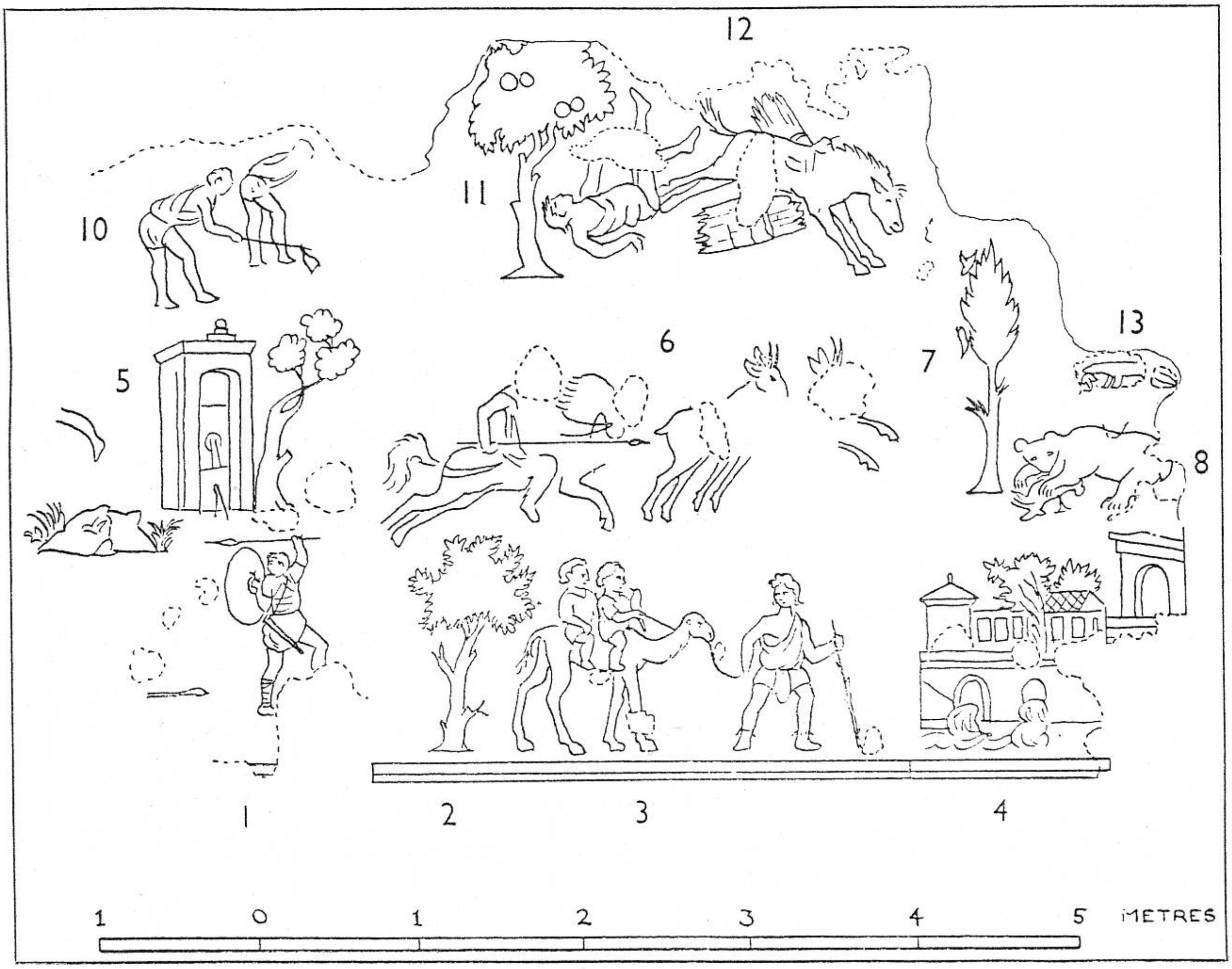

FIG. 30. Disposition of the mosaic below Torun Sokak.

* 3. *Two Boys on a Camel, which is being led by a Man* (Pl. 45). The camel is in various shades of brown, with the portions in deep shade, at the tail, behind the boy's legs or under the neck, in black. The costume of the foremost boy is olive green and white, his flesh is in shades of pink. He wears a wreath of blue, green and yellow-green, and carries before him a tame bird with brownish body and black beak. The second boy's costume is pink and his hair brown and black. The leader

(ht. 1 m.) wears grey boots, outlined in black; his chiton is in various shades of grey, and is tied with a belt of blue, green and yellow. He carries a staff, olive green in colour. The composition is an unusual one.[1]

* 4. *A Building* (Pl. 46, A, and Frontispiece). The building is buff above; below are two arched openings in black, from the bottoms of which water gushes out into a pool below. The moving water is in grey and green, the still water of the pool is blue, green and grey. On the top of the building is a circular tower with overhanging conical roof. Beside the building is a luxuriant tree, and to the right is an arch in brownish red, shaded in black. The building is closely similar to those so popular in Roman paintings and stucco work.

Second Register

5. *A Fountain* (Pl. 44, A). This is next to the hunter, uncovered and described before the war (*G.P.*, p. 70, no. 9, pl. 28). Height 1·25 m. It takes the form of a tower-like structure, square in plan, done in buff and brown, with an arched opening in the front wall. The fountain itself, in the form of a lion's head in grey, is on the back wall; water gushes from it and is caught in a basin below, which is protected by a yellow-brown grille. The ceiling of the niche bears a decorative pattern in black on a yellow-umber ground. Close to the fountain, and in part obscured by it, is a pine tree, with thick trunk and sparse foliage. The tesserae are laid in horizontal bands, as in the tree to the left, and not vertically, as in that to the right (no. 2). A change of 'workshop' thus probably took place immediately to the right of this tree.

* 6. *A Mounted Hunter, with Spear, chasing two Deer* (Pl. 45). The rider's costume is red, his cloak green and blue, his trousers grey, lined in black, and his boots brown; they would appear to be of the soft leather variety, almost like stockings. He rides without stirrups, but his bridle is quite elaborate. The deer are in grey and buff, outlined in dark brown and black. The ground is nowhere indicated.

* 7. *A Cypress Tree* (Pl. 46, B). Height 2·4 m. The tree extends into the third register. The trunk is shaded on the right, in dark olive-green tesserae; the portion in high-light is grey-buff. The tesserae are laid with a tendency to follow horizontal lines, in a manner distinct from that of adjacent trees (nos. 2 and 11). The tesserae of the foliage, blue, green and yellow on a black ground, are also laid in bands, and

the technique here is also distinct. Birds flutter among the branches, but they are not so well done as those in some of the mosaics discovered before the war (*G.P.*, no. 7, p. 70, pl. 30).

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[1] A very primitive mosaic in a basilica on the Island of Syme in the Dodecanese, shows a man leading a camel; the latter, only preserved in part, may belong to a similar composition: *Π. ΛΑΖΑΡΙΔΟΥ*, "*Τὰ παλαιοχριστιανικὰ μνημεῖα τῆς Δωδεκανήσου*," in *Proceedings of the Ninth International Byzantine Congress at Salonica*, Athens, 1955, p. 241 and pl. 47, 1.

* 8. *A Bear devouring a Lamb* (Pl. 46, B, and Colour Pl. A). The lamb is pale buff, outlined in black, the bear black and dark brown. A stream of blood in red and pink gushes from the lamb.

Third Register

9. *A Tree—perhaps an Oak* (Pl. 47). Height 1·3 m. Except for vertical lines of black on the left and grey on the right, the cubes, which are brown and green, are laid in horizontal bands, in a technique previously described by Brett (*G.P.*, p. 68, n. 2). The leaves are green, yellow-green, blue and pale violet, against a black ground. The tree serves to separate the scenes to its left, which face left, from those to its right, which face in the opposite direction.

10. *Two Men, hoeing* (Pl. 47). This composition was partially uncovered in 1938 (*G.P.*, p. 72, no. 13 and n. 1). The foremost man has his mattock raised above his head; he wears a beige-brown chiton, with green belt. The second man's mattock, which has two prongs, is striking the ground. He wears a greyish chiton, with red belt, and has elaborate knee-pads of green, blue and yellow. Both men have bare feet.[1]

* 11. *A Pomegranate Tree* (Pl. 45). Height 1·3 m. The right side is in the shade, and the trunk is composed of tesserae arranged vertically. Below there are twelve, the leftermost row being black, the next two grey, the next six pale olive-green, the next black, the next dark grey, and the final one black. The colours are disposed in the same way at the top of the tree, but there are six rows only. The leaves are green, yellow-green, and blue against a black ground. The fruits are pink, their left sides being in shade.

* 12. *A Man being kicked off his Mule* (Pl. 45). The mule is in black and grey tesserae, the bridle red, and the pack-saddle brown with black straps. Bundles of sticks, in brown and olive-green, were strapped to the pack-saddle, and the man was seated on top. But with the mule's kicking the sticks are falling to the ground, and the man has somersaulted over the mule's tail. The man wears a brown chiton. The mule, which has a very wicked look in its eye, is about to kick him once more as he falls. The mosaic is particularly interesting; it is, to begin with, extremely

expressive; secondly, it attempts to show action in time as well as in space; and thirdly, it is one of the few intentionally humorous compositions of the art of the period. Beyond this composition, the upper part of the tall tree already described (no. 7) extends from the second register. (See also Colour Pl. B.)

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[1] Brett cites parallel scenes on a sarcophagus at Rome and on a Coptic textile at Brooklyn: 'The Brooklyn Textiles', in *Coptic Studies in Honor of W. E. Crum*, Byzantine Institute, 1950, p. 438.

* 13. *A Small Animal, presumably a Weasel* (Pl. 46, B). The animal is done in various shades of buff and outlined in very dark brown. It carries in its mouth a bird, done in grey, blue and green, from which fall drops of red blood.

(2) The Border

(a) *Below Torun Sokak*

Below the hunter (no. 1) there is a small portion of border, in poor condition. A scroll of the usual form contains a crane, done in various shades of grey and black. It stands on one leg, with its head turned back over its body. Below the camel and its leader there are four more scrolls; they contain a spotted fruit, presumably a melon, two fruits, perhaps quinces, an apple and a tray-like form with three pears upon it (Pl. 48, B). Beyond this, below the building (Fig. 30, no. 4), is a further scroll, with a bunch of grapes inside it (Pl. 49, B).

The border in this area is on the whole less elaborate and less well done than that towards the far end of the north-east portico (section A, A1; see below). The lively animals and realistic flowers and vegetables which there occupy the spaces between the scroll and the inner and outer borders are absent, and the details are not so finished. This section was certainly done by different and less accomplished men, perhaps apprentices.

(b) *Area A, A1* (*G.P.*, plan 60)

An extensive section of border was discovered below the foundations of one of the walls of the arcades of Araste Sokak, and was removed in sections (See Pl. 43, C), which have now been placed in a vertical position against the reconstructed wall. The section of border begins immediately below the tails of the two hounds (*G.P.*, pl. 34) and extends to the north-west as far as the warrior (*G.P.*, pl. 36). It comprises scrolls akin to those found previously, but at the very commencement of the section they frame a great head in a similar manner to that in which the Oceanus heads found before the war were framed (Pl. 50 and Colour Pl. C). It would seem that heads of different type were interspersed at intervals along the border; there cannot have been just one head on each side, as was suggested in the first report (*G.P.*, p. 66).

The first portion of scroll is in pale blue and black, and ends in what is almost a cornucopia of acanthus leaves, pale brown outside, with high-lights in white and pinkish-red inside. This foliage in part overlies blue, black, grey and green scrollwork, which frames the great head, 43 cm. high from chin to forehead. A second acanthus 'cornucopia', facing in the opposite direction, frames the head on the other side. Lilies grow out of the former, a fruit that looks like a pear out of the latter. The head is very carefully and elaborately modelled in various shades of brown and pink. The mouth is red, the moustache is in blue and grey tesserae; in spite of the fantastic colouring, however, the effect is not only very forceful, but also quite realistic. The tesserae are very small and carefully selected and graded (Pl. 49, C); in the face there are 420 in a square of 10 cm. The head is undoubtedly one of the most striking and important pieces of mosaic of the late classical and early Christian periods that has so far come to light.

Beyond the head the scrolls of blue, pale green, black and various shades of brown continue (Pls. 48, 49). Each turn of the scroll frames a different motif, though all are elaborate. In the first is a running dog, like a greyhound, its back legs obscured by the 'cornucopia' framing the great head. The dog, in various tones of buff and brown, is shaded in black; it has a white collar. The scroll terminates in a brown 'cornucopia', and at the corner of this is a lizard, in grey and black, looking upwards at a serpent in pale brown. From the next 'cornucopia', which faces inwards, spring flowers which appear to be peonies, in pink and red. The next has no flowers, but where they might have been is a tortoise, in grey, outlined in black, and with the pattern of its shell in green and blue. Within the scroll is a turkey, in blue, grey and black, with a red head (Pl. 48, A; see also p. 140). The next 'cornucopia' is directed inwards. From it a scroll curls round to support what looks like a round tray, on which are cherries, and from its stem sprout two pomegranates, to fill the vacant space between the end of the scroll and the preceding 'cornucopia'; between it and the next one are two bunches of grapes. Inside the scroll is an animal which appears to be a bull. Within the next scroll is a gaily coloured pheasant with long tail (Pl. 49, A). Below, on one side, are two paprika pods, and on the other two peonies. Within the next scroll there was a large flower with open petals in light blue, dark blue and red, but it is no longer possible to identify it. From the next 'cornucopia', directed outwards, spring two plants of black and blue; within the scroll is a second pheasant. On the inner side the scroll terminates in a sprig of cherries. From the next 'cornucopia' sprout two pears, while the scroll terminates in an upward turned sprig bearing two artichokes and a main stem which turns over to support what looks like a tray with a melon upon it (see p. 128 f.). The leaves of the artichokes are very accurately represented; in many cases the leaves do not correspond with the fruit or flower associated with them. At this point the mosaic breaks off.

The variety and liveliness of this section of the border is exceptional. Almost every kind of fruit and vegetable seems to have been included, and the repertory of flowers and fauna is extremely varied. The colours are brilliant and elaborate, and the technique is of the finest. It is obvious that the most outstanding masters of the whole floor must have worked on this section of the border, which far surpasses in quality not only the sections of border found elsewhere but also much of the main area of the floor. The importance of the subject, the great head, and the elaboration of the work suggest that this section may well have stood opposite to a door or similar feature.

B. ANALYSIS OF THE DECORATION

Mosaics that are in one way or another comparable generally speaking exist in numerous other places, and cover a long period of time. In fact, the Constantinople floor was essentially of an eclectic character and the sources of the motifs of the decoration were manifold. It will therefore be best to examine them under individual headings. In attempting this in the pages that follow, stress will be laid on those themes that have not already been discussed by Brett,[1] and this study must be regarded as complementary to his, rather than as a substitute for it.

1. *The Border Scrollwork*

The closest parallels to the elaborate acanthus scroll of the border are to be found in some of the mosaics at Antioch. One that might almost have served as a prototype appears in the Constantinian villa, dated to around 325.[2] Scrolls on the porphyry sarcophagus of Constantia in the Vatican, and on a fragment of the same type and date in the Museum of Antiquities at Istanbul, may again be compared,[3] though they are obviously more classical. Other parallels in sculpture of the period of Constantine could be cited. In wall mosaics the closest parallels are to be found in the narthex of the Baptistry of the Lateran, which were done under Sixtus III (432-440).[4] In all of them the acanthus is of a realistic type; in work of a later date the stems tend to be much rougher, with calyxes closely repeated.[1] The rough stems had already become popular in the earlier wall mosaics, like those of Santa Maria Maggiore in Rome (432-440), the Mausoleum of Galla Placidia (*c.* 440) or the Baptistry of the Orthodox (449-458), both at Ravenna. The last mentioned perhaps affords the closest parallels.[2] In the earlier scrolls, moreover, it is not only the leaves that are more naturalistic; the creatures that inhabit the scrolls are also mostly of the type that one would expect to find among foliage in nature, such as birds, grasshoppers or hares. Dragons do appear as early as the second century, but on the whole it was only in the later scrolls that creatures of a more fantastic character, such as confronted peacocks or fabulous beasts, came into favour.[3] But they were by no means always present in the later work; for example, they are absent in a scroll in the upper level of the glass court of Jerash, of the late fifth century.[4]

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[1] Brett, *G.P.*, pp. 64 ff. See also his 'The Mosaics of the Great Palace in Constantinople', *Journal of the Warburg and Courtauld Institutes*, vol. v, 1942, p. 34.

[2] Levi, pl. LVII.

[3] Delbrueck, *Antike Porphyrwerke*, Berlin, 1932, pls. 104 and 107.

[4] For the mosaics, see M. Van Berchem and E. Cluzot, *Mosaïques chrétiennes*, p. 9 and fig. 12, and Wilpert, *Die Römischen Mosaiken und Malereien der kirchlichen Bauten vom IV. bit XIII. Jahrhundert*, Freiburg, 1924, vol. III, pls. 1-3. The dating to the time of Sixtus III has been established by G. B. Giovenale, *Il Battistero Lateranense*, Instituto Pontifico di Archeologia Cristiana, Studi di Antichità Cristiana, I, Roma, 1929.

The small animals and birds at Constantinople all show real feeling for nature and are essentially representational. Animals of the type did on occasions have a symbolic significance. For instance, the association of the cock and the tortoise was symbolic of the fight between good and evil, light and darkness, or even orthodoxy and arianism.[5] But it is unlikely that these creatures at Constantinople had anything more than a decorative function, for they are treated in exactly the same way as and occupy similar positions to the fruits and flowers, which have no symbolical associations, while similar birds and animals occur as purely decorative elements elsewhere; the cranes of the Constantinople mosaic are thus closely similar to flamingoes in the floor of a church at Khirbat Asida in Palestine dating from the fifth century,[6] where they appear as part of the normal animal landscape.

A particularly interesting feature with regard to the fruits and flowers is the curious termination of some of the scrolls in what appear to be trays, with various sorts of fruits upon them (Pl. 49, A). A similar 'tray', with fruit upon it, appears in the floor at Beisan,[7] but it does not there constitute the termination of a scroll; the floor dates from about 530. In the Damascus mosaics (*c.* 715) an acanthus

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[1] For a very useful study of the development of scrolls, see M. Van Berchem, in Creswell, *Early Muslim Architecture*, vol. i, pp. 173 ff. and figs. 122-131.

[2] Wilpert, *op. cit.*, pl. 80.

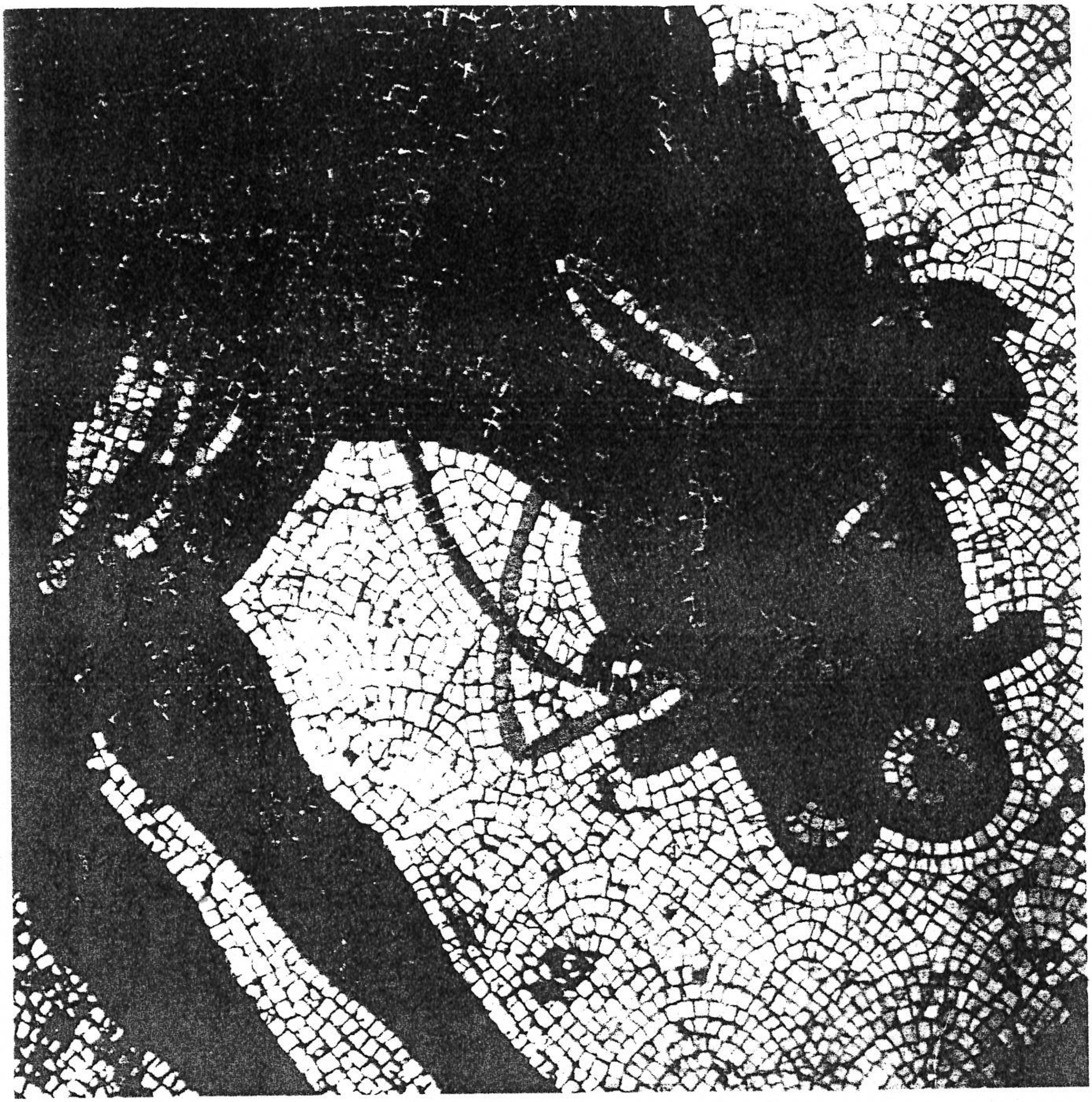
[3] C. R. Morey, *Early Christian Art*, p. 35. See also J. M. C. Tonybee and J. B. Ward Perkins, ' Peopled Scrolls; a Hellenistic Motif in Imperial Art', *Papers of the British School at Rome*, xviii, 1950, who discuss the history of scrolls in detail.

[4] J. M. Crowfoot and F. M. Biebel, *Jerash, City of the Decapolis*, New Haven, 1938, p. 312 and pl. LVIII.

[5] J. Fink, *Der Ursprung der ältesten Kirchen am Domplatz von Aquileja*, Münsterische Forschungen, Heft 7, 1954, p. 14.

[6] D. C. Baramki and M. Avi Yonah, 'An Early Church at Khirbat Asida', *Quart. of Dpt. of Ants. of Palestine*, iii, 1934, p. 19 and pl. XI.

[7] M. Avi Yonah, 'Mosaic pavements at al Hammam, Beisan', *Quart. of Dpt. of Ants. of Palestine*, v, 1936, pl. XVI, 2.



MOSAIC · DETAIL OF MULE (No. 12)

plant has been stylized in a similar way, so that it terminates at the top in a sort of bowl, in which fruits are placed (Fig. 31).[1] A closely similar stylization appears in the mosaics of the Dome of the Rock at Jerusalem (691-692), where fruits appear arranged on a leaf.

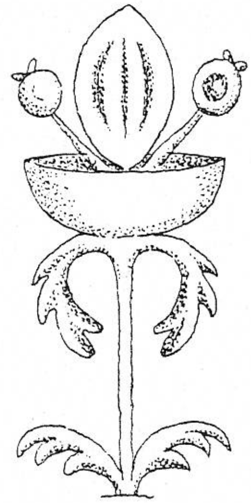


FIG. 31. Detail from the Damascus mosaics; flower.

This convention goes back to Roman times, for it appears on a pavement, perhaps of the first century, which is cited by Miss Van Berchem.[2] On a sculpture of the fifth or sixth century in the Museum of Antiquities at Istanbul a rendering appears which is rather closer to that of the Constantinople mosaic, for the fruits are in a basket which forms the termination of a scroll, just as the 'tray' does in the Constantinople mosaic.[3] A somewhat similar stylization appears in the mosaics at Zliten, where the scrolls end in nests with birds in them.[4] They are probably to be assigned to the second century. Similar terminations appear in the seasons mosaic from Antioch in the Louvre, of the early fourth century.[5]

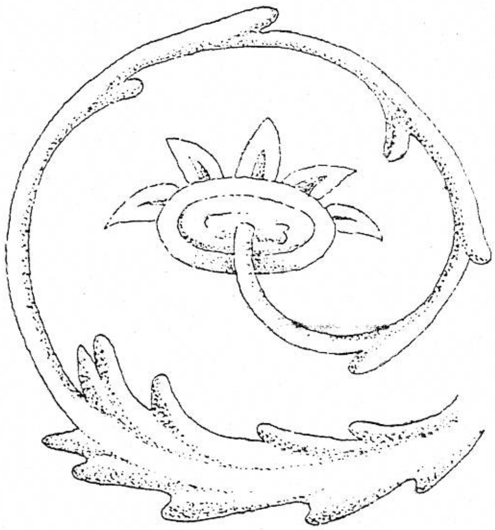


FIG. 32. Detail from the Tarsus mosaic; flower.

Examples thus cover a long period of time. The evolution of this curious motif from a purely naturalistic prototype is, however, best shown by a mosaic from Tarsus, now in the Antioch Museum. Here the scrolls terminate in overblown blossoms, which approach very closely to the form of the 'trays' of the Constantinople floor (Fig. 32). The petals are turned down, leaving only the central portion of the flower; it would only be a small step in the path of stylization to turn this flower into a 'tray'. The stage of evolution of the Constantinopolitan examples is thus fairly developed, and belongs to a more advanced typological stage than the Tarsus mosaic. The latter has been assigned to the third century,[1] though it may be later. The Constantinople examples would, on the basis of this evidence, hardly be earlier than the fourth, and might belong to the fifth or even the sixth century.

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[1] This is among the mosaics of the north-east corner of the court, which have been laid bare fairly recently, and are not included in the publication by Miss Van Bechem in Creswell, *Early Muslim Architecture*, i.

[2] *Loc. cit.*, figs. 157-166.

[3] Mendel, *Catalogue des sculptures, Musées Impériaux Ottomanes*, vol. ii, 1914, no. 710, p. 509.

[4] S. Aurigemma, 'I Mosaici de Zliten' *Africa Italiana*, ii, Roma-Milano, 1926, pl. E and fig. 136. Aurigemma notes the Greek character of these mosaics.

[5] Levi, *op. cit.*, pls. LII-LVII.

2. *Heads in the Border*

The most important feature of the border, however, is the presence at intervals of great heads framed in the scrollwork; before the war two bearded heads representing Oceanus were unearthed (*G.P.*, pls. 31 and 43); subsequently the great moustached head (Pl. 50) has been found. In spite of the use of blue and green tesserae in the hair and moustache,[2] the heads are basically naturalistic, and the moustached head is virtually a portrait, one would almost think that of some barbarian chieftain, who had found his way to the Byzantine court either as an ambassador or as a prisoner. The physical appearance is that of a 'barbarian' rather than an inhabitant of the Roman world, and one would seek for parallels in Parthian or Sarmatian rather than in classical art.

The Oceanus heads, on the other hand, belong to an old-established classical repertory, which was widely spread in late Roman and early Christian times. Such heads probably first became popular in the second century.[3] An example from the floor of the Atrium house at Antioch (*c.* 115) may be noted, but the scroll that frames it is more naturalistic and belongs to an earlier type.[4] Such heads became more usual in the third century; one in a mosaic of that date from Carthage, now in the British Museum,[5] on the one hand, and another from the floor of a villa at Withington in Gloucestershire, also in the British Museum,[6] on the other, may be compared. In North Africa they are comparatively common, but are in general of a more aquatic character than elsewhere, the hair looking like sea-weed rather than leaves.[7] Nearer at hand, the head appears again on two capitals now in the Constantinople Museum, one from Macedonia and the other of unknown provenance; both have been assigned to the age of Justinian.[8]

A similar capital was recently unearthed during excavations on the site of the new Palace of Justice at Constantinople.[1] Another example is built into the eastern chapel of St. Praxede at Rome, along with other pieces of sculpture of various dates. This multiplicity of examples—and many more could be cited—from widely separated areas, serves to indicate the popularity of the motif, and at the same time to stress the unique character of the moustached head. The evidence that the heads offer with regard to date is, however, far from conclusive. The existence of bearded heads framed in foliage in mediaeval Gothic sculpture in the west[2] need not concern us, but the classical examples extend over a wide area and a long period.

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[1] *Turk Tarik Kurumu*, Seri IX, no. 4, 1952, p. 415.

[2] Similar coloured tesserae are used for the hair in some of the Piazza Armerina mosaics. See B. Pace, *I Mosaici di Piazza Armerina*, Rome, 1955, pl. III. See below p. 156.

[3] J. M. C. Tonybee and J. B. Ward Perkins, *loc. cit.*, p. 22 and pl. XI, 3. For other examples see R. Kautzsch, *Kapitelstudien*, Berlin, 1936, Taf. 45.

[4] Levi, *op. cit.*, pl. I.

[5] R. Hinks, *Catalogue of Greek, Etruscan and Roman Paintings and Mosaics in the British Museum*, 1933, no. 15, p. 75, pl. XXVIII.

[6] Hinks, *loc. cit.*, no. 37, fig. 128.

[7] P. Gauckler, *Inventaire des mosaïques de la Gaule et de l'Afrique*, Paris 1911 *seq.*, no. 448, at Birchana, and no. 576 at Medeina. A head at Ain Temouchert in Algeria (no. 318), on the other hand, is more 'expressionist' and has the appearance almost of a Byzantine Pantocrator.

[8] Mendel, *op. cit.*, no. 747. Peirce and Tyler, *Art Byzantin*, ii, pl. 112. See also R. Kautzsch, *Kapitelstudien*, Berlin, 1936, p. 213 and pl. 45.

3. *Architectural Motifs*

These occur in the main floor in several instances, and represent buildings of classical type, such as arches, tholoi or fountains (Pls. 44 and 46, and *G.P.*, pls. 28, 29 and 30), and sometimes also structures of a more everyday character, like the water-mill (*G.P.*, pl. 41). The former follow more or less set types, which were repeated over many centuries with only very minor variations; a fountain in the fourteenth century mosaic of Kariye Camii may thus be compared with that situated below the two peasants working with mattocks (Pl. 42, A, C). The water-mill, on the other hand, is more spontaneous and reflects the very keen interest in natural subjects which all these mosaics show. It would seem almost to be a study from nature, and is particularly vivid and delightful.

4. *Human Figures*

These again fall into distinct categories. The female in the Bacchic procession (*G.P.*, pls. 31 and 51), the 'philosopher' (*G.P.*, pl. 35) or the lute player (*G.P.*, pl. 30) are classical in character and follow very ancient prototypes. The figures associated with hunting scenes (Pl. 44, B, and *G.P.*, pls. 28, 36 and 37) similarly belong to a well-established repertory, though the prototypes here were ultimately of eastern rather than classical origin (see p. 146). But there are other figures which seem, like some of the buildings, to be spontaneous, like the boys with geese (*G.P.*, pls. 32 and 33) or more especially, the man being kicked off his mule (Pls. 45). The woman with a child at her breast (*G.P.*, pl. 32), the fisherman (*G.P.*, pl. 33)[3] and the boys playing with hoops in the Hippodrome (*G.P.*, pl. 29) seem to fall half-way between. But whether they follow older prototypes or not, the faces are all treated with great liveliness, they are subtly modelled, and there is real understanding of character (*G.P.*, pls. 47 and 56). The treatment would seem to fall somewhere between the narrative manner of Imperial Roman art and the more impressionist rendering of the mosaics of Santa Maria Maggiore at Rome, done between 432 and 440.[1] If anything, the Constantinopolitan figures are closer in style to the work in Santa Maria Maggiore than to the floors of earlier date, where a colder, more severe, manner predominates.

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[1] Rüstem Duyuran, 'Second Report on Excavations on the site of the new Palace of Justice at Istanbul', *Istanbul Arkeoloji Müzeleri Yilligi*, no. 6, Istanbul, 1954, fig. 11.

[2] See, for example, a sketch by Villard de Honencourt, A. Gleizes, *La Forme et l'Histoire*, Paris, 1932, p. 180.

[3] A somewhat similar fisherman appears in association with a scene of essentially nautical character at Henchir Thina in Tunisia; Gauckler, *Inventaire*, no. 18.

5. *Trees*

Trees constitute a very favourite motif at Constantinople, and in their brilliance and variety are unrivalled elsewhere. Brett has already noted what is probably a plum (no. 2), a date palm (no. 5), a cypress (no. 50), a pear (no. 34), an olive (no. 66) and a citrus (no. 78). To these may be added another, and particularly fine, cypress (no. 7, Pl. 46, B) and what is perhaps an olive (no. 2, Pl. 45) and an oak (no. 9).[2] A striking characteristic of these trees is the way in which they are treated in and for themselves. Trees appear in early work often enough, for example on a fifth-century ivory of the Resurrection at Munich,[3] or in some of the earlier mosaics at Antioch, such as the House of the Red Pavement (*c.* 160), the House of the Boat of Psyche (*c.* 250) or the House of Menander (*c.* 260).[4] But in these instances they are either stylized, or form a part of the background. Their role in the Rossano manuscript, which is important, is similar.[5] In the Constantinian villa at Antioch (*c.* 325) they play a more individual part in the composition,[6] and this role is developed in later work at Antioch, such as the Megalopsychia and the Martyrium of Seleucia, both to be dated around 500.[7] There they are on the same plane as the figures, standing beside and not behind them. At Constantinople they are similarly in the same plane, but constitute individual elements in the composition, just as important as the humans, the animals or the buildings. They play a similar part on a silver plate of the early sixth century in the Hermitage.[8]

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[1] Wilpert, *Mosaiken und Malereien*, iii, pls. 9 ff. Also C. Cecchelli, *I Mosaici della Basilica di S. Maria Maggiore*, Torino, 1956.

[2] On the wall mosaics the types of tree shown are far more restricted. Olives appear occasionally, as do larger trees, which may be oaks or planes, but apart from these the only type that appears regularly is the date palm, usually in a very stylized form. Even the earliest of these, in the apse of Santa Costanza, are far more stylized than those in the Constantinople floor. They are probably to be dated to the fifth century. For a summary of the types of trees found in the wall mosaics see M. Van Berchem and E. Clouzot, *Mosaïques Chrétiennes*, Geneva, 1924, p. xxxiv.

[3] Peirce and Tyler, *Art Byzantin*, i, pl. 96.

[4] Levi, pls. XII, XXXVIII, *c*, and XLVI, *c*.

[5] A Haseloff, *Codex Purpureus Rossanensis*, Berlin-Leipzig, 1898, pls. II and XI.

[6] Levi, *op. cit.*, pls. LVI and LVII.

[7] Levi, *op. cit.*, pls. LXXVIII, LXXXVIII and LXXXIX.

[8] Matszulewitsh, *Byzantinische Antike*, Berlin-Leipzig, 1929, pl. 31. Matszulewitsh suggests that the vessel is to be assigned to the time of either Anastasius or to Justinian. The former seems more probable on stylistic grounds.

Certain very marked conventions characterize the rendering of the trees in the mosaics. A particular form of tree, with twisted trunk, occurs from early times onwards, as for example in the House of the Red Pavement at Antioch, while there are nearly always a number of stumps of branches cut off near the trunk, which appear regardless of the species of tree.[1] The tesserae of the trunks again are nearly always laid in the same way, that is in parallel vertical strips. In the earlier examples the light falls from one side only, the other side being in shadow, whereas in the later ones, like the Megalopsychia at Antioch, both sides are in shadow, and only the front of the tree is light. One might indeed say that the trees in these later renderings are shown frontally, just like the figures of 'oriental' as opposed to classical art. In the Constantinian villa at Antioch the light falls from one side only, but the source is not uniform for all the trees in the same picture. This manner of shading the trunks was used at a later date by the mosaicists of the Dome of the Rock at Jerusalem (691-692) and the Great Mosque of Damascus (*c.* 715), as well as in the floor mosaics of the late seventh-century palace at Khirbat al Mafjar.[2] Trees in the Madeba mosaic are of the same type, but are much more severely stylized than those at Constantinople[3]; others on a floor in the church of St. Lot at Mukhayyat in Palestine, dated by an inscription to 602, 617 or 632, according to the way in which it is deciphered, are again of the same type.[4]

At Constantinople the trees show less general uniformity than those elsewhere. In some of them, for example, a distinctive chequered technique was employed (*G.P.*, pl. 28), while in others highlights and shades were used rather indiscriminately to bring out the ridges and hollows of the trunks (*G.P.*, pl. 36). We see this manner of indicating the roughness of the trunks developed rather further in San Vitale at Ravenna, where the tesserae are arranged in vertical stripes; the colours there bear little relation to nature or to shading, and have a purely decorative role.[5] The chequered technique is paralleled in trees at at'Tābgha, but the work where it appears belongs to a period of restoration, which Schneider dates in the sixth century.[6] The work here is much coarser than that at Constantinople, and one would regard it as certainly later in date as well as less proficient.

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[1] Trees with similar sawn-off branch stubs remained in favour till mediaeval times. See A. E. Brinckman, *Die Baumstilisierungen in der Mittelalterlichen Malerei*, Strasburg, 1906.

[2] R. W. Hamilton, 'A mosaic carpet of Umayyad date at Khirbat al Mafjar', *Quart. of Dpt. of Ants. of Palestine*, xiv, 1950, p. 120. There is a coloured plate.

[3] *Isvestiya of the Russian Archaeological Institute at Constantinople*, viii, Sofia, 1902, pl. VIII.

[4] J. M. Crowfoot, *Early Churches in Palestine*, London, 1941, p. 141 and pl. XXIII.

[5] P. Toesca, *San Vitale at Ravenna*, The Mosaics. London, 1954, pls. III and IX, in colour.

[6] *Church of the Multiplying of the Loaves and Fishes*, London, 1937, pl. 21 and p. 64.

The manner of treating the foliage at Constantinople is again distinctive, for the green, blue and yellow-green tesserae which compose the leaves are set in large masses against a dark ground. This dark ground played a less important part at Antioch, but it is one of the outstanding features of the Damascus mosaics. In sculpture a closely similar convention regulating the treatment of the foliage is followed in a slab in the Byzantine Museum at Athens, which has been dated to the time of Arcadius, though it may be later.[1]

There can be no doubt that the trees at Antioch and Constantinople, at Jerusalem and Damascus, and even in San Vitale, all belong to the same repertory, and stem from the same prototypes. The common source was probably the landscape style which we see in the wall paintings of Boscoreale, Pompeii and elsewhere, which is usually known, rightly or wrongly, as the Alexandrine manner. From the technical point of view, however, there are certain details that seem to be distinctive of Constantinople, notably the chequered manner of doing the trunks, or their treatment so that several distinct areas are in shade. These mannerisms contrast with the greater feeling for naturalism which we see at Antioch and with a far more impressionistic rendering at Piazza Armerina.[2] This impressionistic manner was further developed in the wall mosaics in the nave of Santa Maria Maggiore, which are probably to be dated between 432 and 440. Here the foliage is shown in quite a different way—red, green, yellow and black being used very effectively.[3] The trees at Constantinople are perhaps to be regarded as distinguishing a more narrowly Byzantine from a Syrian trend of development on the one hand and an Italian on the other. But if the trunks distinguish the Constantinopolitan trees from the Syrian, the nature of the foliage serves to link the two schools, and it is to be doubted if there is really enough evidence to separate these lines of development. The only firm conclusions that do emerge are, firstly, that the Constantinopolitan trees belong to a later stylistic phase than those of the Constantinian villa at Antioch (*c.* 325), and to an earlier one than those in San Vitale at Ravenna (*c.* 530), and secondly that the manner of dealing with the foliage is quite distinct from that which was in favour at Rome in the fourth century.

6. *Coulisses*

Brett used this term to describe the small areas of ground and vegetation that appear below or beside some of the figures; they are all that survive of the landscape backgrounds in which the animals and hunters disported themselves in an earlier phase of this art. At Constantinople they are reduced in scale to the absolute minimum, or are more often omitted completely. Of the nine hands noted by Brett (*G.P.*, p. 87), only one used the coulisses regularly. A further master, who did the work unearthed in 1952 from below the Torun Sokak, also favoured them, though they are a good deal scantier than in the work of Brett's fourth hand. They are used equally sparingly in much of the later work at Antioch, for example in the Megalopsychia (Levi, pl. LXXVIII) and in the house of the Worcester Hunt (Levi, pl. CLXX). In the early work, like that in the House of the Red Pavement (*c.* 160), on the other hand, the ground is shown throughout; the principal figure, Narcissos, stands in a landscape, and there are little shadows, rather like leaves, beside his feet (Levi, pl. XIV). In the mosaics of the Constantinian villa each animal is shown with ground under its hind legs, though the fore legs are in vacant space. One is thus tempted to conclude that the presence or absence of the ground should be taken as a dating factor, but this is not so. In the latest of all the dated floors, that from Apamea, now at Brussels, for example, which may be securely assigned to 539, there are numerous sprigs of foliage, and every figure casts a shadow in just the same way as in work of the second century at Carthage (Pl. 42, B).[1] The ground also plays an important part in the House of Philia at Antioch (*c.* 450), where animals similar to some of those at Constantinople appear (Levi, pl. LXXII). Even such a stylized beast as the Beribboned Lion (*c.* 440) also has ground below it, though it scorns to tread on it. Similar coulisses are used on a mosaic showing Orpheus among the animals from Thina.[2]

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[1] *Guide du Musée byzantin d'Athènes*, 1932, fig. 19. See also J. Kollwitz, *Ostromische Plastik der Theodorianischen Zeit*, Berlin, 1941, pl. 54.

[2] Compare the style discussed and illustrated by R. B. Bandinelli, 'Continuita ellenistica nella Pittura l'eta medio e tarda Romana', *Rivista della Instituto Nazionale d'Archeologia e Storia d'Arte*, N.S., ii, Roma, 1953, figs. 70 and 71.

[3] Wilpert, *op. cit.*, vol. iii, pl. 12. For the date, see Cecchelli, *op. cit.* See p. 132 below.

Doro Levi suggests that the use of coulisses on long panels represents the first stage towards the system of arranging the compositions of such panels into a series of superimposed horizontal bands.[3] But the bands were already familiar to sculptors of the Imperial period,[4] and in the earlier examples they are usually linked by such devices as tall trees or plants; at times these linking motifs even constitute almost the principal element of the design, as at at'Tabgha in Palestine. At Constantinople the vertical linkages are rare though they do occur (Pl. 46, B). It is, however, still not possible to assert that all works where the linkages are absent are of late date, even if their absence may be taken as an indication, nor can the absence or presence of coulisses or of cast shadows be regarded as affording indisputable evidence as to dating. For example, small, mountain-like coulisses are used in the miniatures of the Menologion of Basil II (976-1025) in the Vatican.[1]

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[1] For example, on a floor now in the Louvre, no. 1796. The Apamea floor still awaits full publication. I am greatly indebted to Monsieur Mayence, its excavator, for permission to reproduce it here.

[2] R. Cagnat and V. Chapot, *Manuel d'archéologie romaine*, 1920, ii, fig. 390.

[3] Levi, *op. cit.*, p. 611 and pl. LIX, *c*.

[4] Schneider, *Church of the Multiplying*, p. 73.

7. *Fauna*

Though many of the animals that appear in the Constantinople mosaic constitute parts of composite groups, such as hunts or animal combats, there are others which are shown alone or in pairs, such as the horses and goats which appear on several occasions (*G.P.*, pls. 30, 35, 41, etc.). But even if these animals stand in space, with at most a sprig of foliage before them, they are nevertheless conceived with a feeling for naturalism which is seldom equalled elsewhere. Indeed, in most other mosaics where animals appear it is the scenes with which they are associated that are important rather than the animals themselves. At Constantinople the contrary is true, and even if the animals belong to scenes, each one is also none the less treated primarily for itself.

Those who see these mosaics for the first time have invariably been struck by the naturalness of the fauna, and they frequently ask whether the artists worked from the life. Many of the animals and birds that are represented were available in the region of Constantinople, and other animals, like the elephants and tigers, may well have been visible in the Hippodrome. But the way in which established iconographical themes are reproduced, the manner in which conventions, like the double kink in the horses tails, are followed in the same way as in far distant regions (see p. 138 f.), the fact that fantastic beasts are done with the same understanding of their natural features as appears in the real ones, and the close similarity that the animals at Constantinople show to those elsewhere, in North Africa, at Antioch, in Sicily or even in Britain,[2] are all factors which suggest that sketch-books must have played a very important part; only in this way, indeed, can the close similarities which extend over a wide area of space and over at least four centuries of time be reasonably accounted for. We cannot say, however, what form these sketch-books took. The illustrations to the works of Oppian and another writer known as the pseudo-Oppian perhaps give some idea,[3] but, unfortunately, no early versions survive and they are known only from later copies. The most important of them is a manuscript of the pseudo-Oppian in the Marcian library at Venice (Gr. 479), which probably dates from the end of the tenth or the beginning of the eleventh century.[1] It contains 148 illustrations, but none is exactly parallel; the most that can be said is that they are animal pictures of vaguely similar character. The illustrations of such manuscripts as the famous calendar of 354 may also have served as models.[2] It is probable, however, even if the Constantinopolitan artists followed sketches for the main outlines of their work, that they also studied nature in order to improve on their models; only on this assumption can the outstanding excellence and the fresh naturalism of the work be explained.

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[1] *Il Menologio di Basilio II* (Cod. Vat. Gv., 1613). Codicis e Vaticanis Selecti phototypici expressi, vol. viii, Torino, 1907, folios 45, 86, and 323.

[2] For example in the pavement at Woodchester in Gloucestershire; see Peirce and Tyler, *Art Byzantin*, i, pl. 65, *a*.

[3] Oppian was the author of the *Halenitica*, and came from Cilicia; the pseudo-Oppian wrote the *Cynegitica*, a book dealing with the technique of hunting with dogs. He came from Apamea and wrote about 215. The importance of these manuscripts as models is stressed by Weitzman, *Greek Mythology in Byzantine Art*, Princeton, 1951, pp. 93 ff. See especially his plate XXXVI. See also his article 'Das klassische Erbe in der kunst Konstantinopels', *Wiener Kunstwissenschaftliche Blätter*, iii, 1954, p. 41.

The repertory of animals is wide, and comprises the following types:—

(a) *Bears*. Bears appear on three occasions, once as a family, where the mother shakes down fruit from a tree for the baby bears to eat (*G.P.*, pl. 44), once devouring prey (Pl. 46, B) and once chasing a man (*G.P.*, pl. 44). The small bears in the first of these scenes are particularly well done. A rather similar scene appears at Uthina, near Tunis, dating from the second century.[3]

(b) *Camel*. A camel appears once only (Pl. 45). The rendering is expressive, but shows less understanding of nature than is the case with many of the other animals, and it is singularly out of proportion to its leader and to the boys on its back.

(c) *Deer*. Deer, of one sort or another, are very popular, sometimes appearing alone and sometimes as part of a hunting scene, where they are being pursued by mounted (Pl. 45) or, more often, unmounted hunters, or by dogs (*G.P.*, pls. 28, 36, 37, 38). On one occasion a deer is being devoured by cheetahs (*G.P.*, pl. 33), and on another by a winged gryphon (*G.P.*, pl. 38). On another occasion a deer is shown being strangled by a serpent, but this is probably a symbolical theme (*G.P.*, pl. 32).[4] In every instance, whether the subject is symbolical or purely naturalistic, the deer are drawn with subtlety and feeling.

(d) *Dogs*. Dogs appear as elements of hunting scenes on several occasions (*G.P.*, pls. 28, 34 and 41); once a dog is shown seated beside its mistress (*G.P.*, pl. 32); once a large dog sits alone (*G.P.*, pl. 35); and once a puppy is held by a boy (*G.P.*, pl. 33). Except for the puppies, the dogs are large, rather like either boar-hounds or wolf hounds.

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[1] The most complete publication of this manuscript is that of A. W. Byvanck, 'De geillustreerde Handschriften van Oppianus' Cynegetica', in *Mededeelingen van het Nederlandsch Historisch Instituut te Rom*, v, 1925, p. 34.

[2] H. Stern, *Le Calendrier de 354*, Paris, 1955.

[3] Gauckler, 'La domaine des Laberii à Uhtina', in *Monuments Piot*, iii, 1896, p. 177 and figs. 3 and 4.

[4] C. Peuch, 'Le cerf et le serpent', *Cahiers archéologiques*, iv, 1949, p. 17.

(e) *Elephants*. This animal appears on three occasions (*G.P.*, pls. 31, 41 and 45). Each is quite obviously by a different hand. In the Bacchic procession (*G.P.*, pl. 30) the drawing is excellent; in the scene of an elephant strangling a lion (*G.P.*, pl. 41) the work is much less accomplished; the third elephant is standing, and though fragmentary, would seem to have been done with little understanding of the animal's appearance. But the rendering of the beast in the Martyrium of Seleucia at Antioch (Levi, pl. CLXXV) is far clumsier than any at Constantinople, and that in a villa at Oudna in North Africa more stylized, for it is striped all over.[1]

(f) *Goats*. Goats appear more often than any other animal (*G.P.*, pls. 30, 35, 36 and 43). Always they are done with real understanding, suggesting a close observation of nature, though very old models must also have been followed; mosaics from Hadrian's villa, now in the Vatican, may, for example, be compared.

(g) *Hares*. Hares appear on three occasions, twice being pursued by hunters with dogs (*G.P.*, pls. 28 and 34) and once where a boy tries to put a basket over the seated animal which is eating grapes (*G.P.*, pl. 28). They are shown realistically, but are always very large in size in comparison with the hunters and dogs that pursue them. Hares eating grapes constitute quite a usual motif of decoration; basically they, or rabbits in the same position, belong to the cult of Dionysios, but it is unlikely that they have any symbolical significance here.[2]

(h) *Horses*. Horses or donkeys appear as elements in idyllic country scenes on several occasions (*G.P.*, pls. 30, 36 and 46); horses with riders, on the other hand, are striking by their absence, in contrast with their prevalence in other places, for example in the Constantinian villa, the House of the Worcester Hunt, and elsewhere at Antioch, at Apamea or in North Africa. The only instances at Constantinople that have been preserved are the mounted bowman who shoots backwards over his shoulder (*G.P.*, pl. 39) and the spearman chasing a deer (Pl. 45); the scene of the rider being kicked off his mule falls into rather a different category (Pl. 45). The horses in country scenes invariably show a real understanding of the anatomy and properties of the animal, and all are pictures of great delight. All are naturalistic, but the convention of a double kink to the tail which is usual in horses in hunting scenes in North Africa and elsewhere is always followed.[1] The excellence of the representation is in every case in marked contrast with the clumsiness of depiction in the Martyrium of Seleucia at Antioch, and on the whole the horses are better done and more naturalistic than those of North Africa, especially the later work there, which is stylised and wooden.[2]

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[1] Bernard, ' Le cheval dans les mosaiques de l'Afrique du Nord', *Bulletin archéologique*, 1906, pt. i, pl. I.

[2] M. Mate and K. Lyapanova, *Woven Textiles of Coptic Egypt*, Moscow, 1951, p. 61 (in Russian). They illustrate two Coptic textiles on which the theme is represented. See pl. XXVI.

(i) *Sheep*. Sheep appear on one occasion in a delightful rural setting, with their shepherd rescuing one of them from a wolf (*G.P.*, pl. 46), and on another quietly grazing, while the shepherd is milking some goats nearby (*G.P.*, pl. 30). A rather similar milking scene appears at Zliten.[3]

(j) *Leopards*. Animals which may be leopards or cheetahs are shown on one occasion devouring a gazelle (*G.P.*, pl. 33).

(k) *Tigers*. On one occasion a tiger attempts to devour a man (*G.P.*, pl. 28); on another a warrior attacks a tiger with his sword (*G.P.*, pl. 45); on another a large and very fine tiger is being attacked by two spearmen (*G.P.*, pl. 37). The rendering of the animal here is very close to that of the tiger sitting beside the personification of Arabia in the floor at Piazza Armerina in Sicily (see Pl. 42, D, and E),[4] and there are other parallels between this floor and that at Constantinople which will be alluded to later (see p. 156).

(l) *Fantastic Monsters*. A chimera, of the usual classical form (*G.P.*, pl. 28) and several winged gryphons of various types (*G.P.*, pls. 33, 36 and 38), also appear, either alone or as one of the elements of a combat scene. Although these are all essentially creatures of the imagination, the monsters are done with the same feeling for nature as the living animals, their several parts, lion's bodies, eagle's heads and so on, all being completely realistic.

(m) *Birds*. Small birds, either hovering over trees or alone, appear fairly frequently (*G.P.*, pls. 30, 32 and 35); geese are shown being driven along by small boys (*G.P.*, pl. 32); there is a falcon on the bird-catcher's back (*G.P.*, pl. 33) and one is carried by the first boy on the camel's back (Pl. 45); long-legged birds, which appear to be cranes, pheasants, cocks and even a turkey appear in the border (*G.P.*, pl. 31, and Pls. 48 and 49), and on one occasion a magnificent eagle is shown struggling with a serpent (*G.P.*, pl. 36): this, however, is to be counted as a mythological rather than a naturalistic subject,[1] though the bird is done with great naturalism. The falcon is identical with one shown in the illustration for the month of October in the Calendar of 354.[2] Birds were popular in all the mosaic floors, and numerous examples can be cited from Syria, Palestine and North Africa. One of the most important series is on the at'Tabgha floor, which is to be dated about 400.[3] Most of the birds on that floor are natives of Syria, and in the African floors birds appear which belong to that continent; African birds are however not unknown in the Syrian mosaics. At Constantinople, on the other hand, there are none that might not have been found in the region, a fact which supports our suggestion that the mosaics were often studied from nature.

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[1] This convention was not followed, however, in the illustrations of the Vienna Genesis; see, for example, the scenes of Laban's bargain with Jacob or his search for the stolen idols. See H. Gerstinger, *Wiener Genesis*, Wien, 1931, pls. 19, 20. Nor do other animals, and especially the trees, of the Vienna Genesis follow the same prototypes as the Constantinople floor.

[2] Bernard, *loc. cit.*, pls. I-XXVI. He distinguishes three periods, the Antonine, that of transition, and the Christian. The work of the former shows the closest parallels.

[3] S. Aurigemma, 'I Mosaici di Zliten', *Africa Italiana*, ii, Roma-Milano, 1925, figs. 54-57.

[4] B. Pace, *I Mosaici di Piazza Armerina*, Roma, 1955, pl. XII; G. V. Gentili, *La Villa Romana di Piazza Armerina*, Rome, 1951. See also *Notizie degli Scavi di Antichità, Academia dei Lincei*, cccxlvi, Rome, 1951, p. 332.

(n) *Reptiles and Small Animals.* Lizards, tortoises and snakes appear both on the main floor and, more especially, in the border (Pl. 48). They are invariably well done, even when on a very small scale.

8. *Hunting Scenes*

Though there are several hunts or combats with animals, both mounted (Pl. 45) and unmounted (*G.P.*, pls. 28, 32, 36, 37, 42 and 45), the motif of the hunt itself is relatively less important than in many of the mosaics of North Africa or Syria, and it is more fruitful to compare the elements that compose the hunts with similar elements elsewhere than to compare the actual scenes. Thus in North Africa the floors from Uthina near Tunis contain elements which are closely paralleled at Constantinople. The floors there probably date from the third century.[4] Two mosaics now at Alaoui may also be noted, on one of which there are four horses confronted,[5] and on the other a hare hunt, in two registers.[6] In both instances the individual figures are similar, but the compositions are distinct. This is even more strikingly the case in a mosaic with a hunting motif from el Djem, now in the Bardo Museum at Tunis.[7] The scene is in three registers; above are two horsemen, with a servant on foot; in the second register is another servant with two dogs on a leash and two other dogs loose, which have scented a hare hiding in a bush; in the third register dogs and horsemen give chase to the hare. The continuous composition over three registers and the depiction of action in time as well as in space are both quite distinct from the underlying idea of the Constantinople work, where the registers and scenes are all disconnected and where the ground itself is as often as not omitted. Hunters with shield and spear which are very similar appear on a floor at Hippone, where they are engaged in capturing a number of wild animals.[1] The work is crowded in the way usual in Africa. Figures on a floor from Utica now in the British Museum are again comparable individually, in particular a tiger, but the artist was more concerned there with the subject than with the individual figures; it is to be dated to the fourth century.[2] Another parallel is offered by a floor from Carthage, which well illustrates the manner in which these themes developed in North Africa in the fifth and sixth centuries.[3] The style is clumsy and provincial in comparison with Constantinople. Another interesting version of the theme, in two registers, appears on a textile of the fourth or fifth century in the Hermitage at Leningrad.[4] Allowing for the differences of material, this version offers a very interesting stylistic parallel with the Constantinople floor, and the weaver must have made use of a closely related model.

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[1] C. Peuch, 'Le Cerf et le Serpent', *Cahiers archéologiques*, iv, 1949, p. 17.

[2] H. Stern, *Le Calendrier de 354*, Paris, 1953, pls. XI, XVII and XVIII.

[3] A. M. Schneider, *Church of the Multiplying*, p. 72.

[4] Uthina is supposed to have been deserted about 250. See Gauckler, 'Le domaine des Laberii à Uthina', *Monuments Piot*, iii, 1896, p. 177 and figs. 3 and 4. For the hunting scene see also M. Rostovtzev, *Social and Economic History of the Roman Empire*, Oxford, 1926, pl. LXVII.

[5] P. Gauckler, *Catalogue des Musées et Collections de l'Algérie et de Tunisie; Musée Alaoui*, Supp. I, no. 172, pl. VI.

[6] Gauckler, *loc. cit.*, no. 288, pl. XIII, 1.

[7] Rostovtzev, *loc. cit.*, pl. LVI. Bernard, *loc. cit.*, pl. III. Gauckler, *Inventaire*, no. 64.

Hunting scenes were also popular at Antioch, especially in the later work. The earliest instance is in the Constantinian villa (Levi, pls. LVI and LVII) (*c.* 325); around 500 there are numerous examples such as the Megalopsychia (Levi, pls. LXXVII and LXXVIII), the House of Ktisis (Levi, pl. CLXXIV), and the Dumbarton Oaks and Worcester Hunts (Levi, pls. LXXXVI-LXXVIII, XC and CLXXIII). In no case is the iconography of the scenes identical with that at Constantinople, but in all cases the elements are clearly related.

Elsewhere in Syria and Palestine other hunting scenes may also be compared. Thus a pavement at Beit Jabrin bears a rider with a spear attacking a panther, similar to the hunter at Constantinople (Pl. 45).[5] The birds that appear in the border at Beit Jabrin are also similar to those in the border at Constantinople, though the style is more linear and the colours less elaborate. The floor is probably to be dated to between 200 and 250. More important, however, is the floor from

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[1] E. Albertini, *L'Afrique Romaine*, 1950, fig. on p. 52.

[2] R. Hinks, *Catalogue*, no. 45, fig. 137. See also T. Morgan, *Romano-British Mosaic Pavements*, London, 1886, pl. facing p. 247.

[3] Rostovtzev, *loc. cit.*, pl. LX, 2.

[4] M. Mate and K. Lyapanova, *Woven Textiles of Coptic Egypt*, Moscow, 1951, no. 6, pl. III.

[5] *Revue Biblique*, 1922, p. 80. Schneider, *Church of the Multiplying*, pls. 12-14.

Apamea (Homs) now in the Brussels Museum (see Pl. 42, B).[1] The bowman shooting backwards at the top, the hunter with shield and spear fighting a tiger, and the man running with two dogs, are all close to individual figures at Constantinople. Further, the scenes are similarly arranged in parallel registers, but plants and cast shadows are present, and the work is closer to earlier prototypes than is that at Constantinople. This is especially interesting, for the Apamea floor is firmly dated by an inscription to 539.[2] It is, nevertheless, less 'mediaeval' in style than that at Constantinople; there is greater realism and a greater degree of classical feeling. The excellence of these mosaics may be contrasted with the very decadent rendering of the hunting theme in some mosaics of the age of Justinian at Tsaritsingrad near Nish in Yugoslavia, which represents a final stage of provincial decadence.[3]

Numerous examples of hunting scenes can be cited in other materials, notably a stone slab at Sofia of the fourth century,[4] a bronze plaque of around 400 in the Louvre[5] and an ivory in the Hermitage.[6] A later variant appears on a casket of the ninth or tenth century in the British Museum.[7] The human figures on most of these works, however, have large clumsy heads and dumpy bodies, akin to those of the four tetrarchs built into the walls of St. Mark's at Venice,[8] and the style is quite distinct from that of the figures on the Constantinople mosaics. The Constantinopolitan work is, in fact, not only of higher artistic quality but is also less debased; for instance, the figures are less linear than they often are on some of the earlier mosaics, notably those at Zliten.[9] These hunts are also distinct from those on a group of late antique sarcophagi.[10] On the evidence of the hunting theme alone, therefore, it would be reasonable to date the Constantinople mosaics after, and not before, the fourth century. Hunts continued to be popular till a very late date, but as time went on this theme of the hunt tended to merge with depictions of scenes of the circus.[1] That stage had not been fully reached at Constantinople.

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[1] *Bulletin des Musées Royaux d'Art et d'Histoire*, Feb. 1936, p. 2 and fig. 10; see also G. Galassi, *Roma o Bizanzio*, ii, Roma, 1953, figs. 205-209.

[2] In the first notice of the floor M. Mayence expressed some doubt as to whether the inscription was of the same date as the floor; subsequent examination has shown, however, that this doubt was quite unfounded.

[3] A resemblance was suggested by Mr. Raleigh Radford in *Antiquity*, vol. xxviii, no. 109, 1951, p. 15. For the Tsaritsingrad floor see *Cahiers archéologiques*, iii, 1948, p. 40.

[4] Peirce and Tyler, *Art Byzantin*, i, pl. 13. See also I. Welkow, 'Relief mit Zirkusspielen aus Sofia', *Bulletin de l'Institut d'Archéologie Bulgare*, 2ème série, i, 1921-22, p. 21 and pl. IV.

[5] Peirce and Tyler, *op. cit.*, i, pl. 67.

[6] Peirce and Tyler, *op. cit.*, i, pl. 122.

[7] O. M. Dalton, *Catalogue of the Ivory Carvings of the Christian Era in the British Museum*, London, 1909, no. 16, pl. XI.

[8] Peirce and Tyler, *op. cit.*, i, pls. 2 and 3. They date from *c.* 300.

[9] S. Aurigemma, 'I Mosaici di Zliten', *Africa Italiana*, ii, Roma-Milano, 1926, figs. 111-116.

[10] G. Rodenwaldt, 'Eine spätantike Kunstströmung in Rom', *Mitteilungen des deutschen archäologischen Instituts, Roemische Abteilung*, xxxvii, 1922, p. 58.

9. *Animal Combats*

Scenes of animals fighting or of wild beasts devouring their prey occur in several instances (Pl. 46, B, and *G.P.*, pls. 33, 35, 38, 41, 42 and 46); these themes, indeed, were very popular and were usually shown with a good deal of realism and a profusion of blood, done in various shades of brilliant red. The animals involved are of various types; deer form the most usual prey. These themes were also fairly usual in North Africa,[2] but appear to have been less common at Antioch and elsewhere in Syria and Palestine. A rendering in opus sectile in the Museo dei Conservatori at Rome, from the Basilica of Junius Bassus, may be compared[3] as far as iconography is concerned, and it is possible that these gory scenes were attuned to Roman rather than to Syrian taste.

10. *The Animal Paradise*

Closely akin to the hunting and combat scenes, because the same types of animals appear in all, are the animal paradises, and they must be mentioned here, for although no animal paradise as such appears at Constantinople, there are elements there which may have been drawn from some rendering of this theme rather than from hunts. In the paradise proper the animals are shown in more static poses than in the hunts, and the types are more varied. Usually they are arranged around a central figure which originally represented Orpheus; he was later transformed into David, Adam, or even Christ the Good Shepherd. There is one such Orpheus mosaic in the Museum of Antiquities at Istanbul[4] which is probably to be dated to the second century. It is, however, the animals and birds that concern us most, for the paradises constitute what are really animal picture-books, which include animals of all kinds and from all regions, shown without any concern for their relative sizes. One of the most striking of these paradises that survives appears on a mosaic in the Beyrouth Museum; it has been assigned to the fifth century, partly on stylistic and partly on archaeological grounds; one would at first suggest an earlier date.[5] The conception here is still very classical and the central figure closely recalls that of Orpheus, though it actually represents Christ the Good Shepherd. Most of the animals are naturalistic, though there are a few curious exaggerations and angularities which suggest that the artist was following a model which he did not always understand. The repertory is very wide and includes African as well as Asiatic types. The most closely comparable renderings to those at Constantinople are the pheasants. A paradise of similar appearance is preserved in the Bardo Museum at Tunis; it comes from Thysdrus and is probably to be dated to the fourth century.[1] Its style is very provincial.

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[1] A. Grabar, *L'Empereur dans l'Art Byzantin*, Paris, 1926, pp. 57 ff. See also his 'Les fresques des escaliers à St. Sophie de Kiev et l'iconographie byzantine', *Seminarium Kondakovianum*, vii, Prague, 1935, p. 103.

[2] For example a mosaic from the Villa of the Laberii now in the Museum at Alaoui, Gauckler and Bernard, *loc. cit.*, pl. IV.

[3] Peirce and Tyler, *op. cit.*, i, pl. 25.

[4] G. Mendel, *Catalogue des sculptures*, iii, 1914, p. 507, no. 1304.

[5] The mosaic has not yet been published; it will be dealt with in a forthcoming book by the director of the Department of Antiquities in the Lebanon. I take this opportunity of thanking him for supplying me with a photograph for study purposes.

At Antioch the mosaics of the Martyrium of Seleucia (*c.* 500) also represent the Paradise theme,[2] though there is no central figure. Many of the animals are closely similar to those at Constantinople, though the work is far more clumsy. An even more primitive version of the theme appears on a floor at Ayas in Cilicia.[3] Here again a similar model must have been used; the very primitive character of the work is to be attributed to the out-of-the-way nature of the locality rather than to late date, for the floor is dated on archaeological evidence to the fifth century.

The Paradise theme was also popular in other materials. An ivory in the Museo Nazionale at Florence, of around 450,[4] and another in the Louvre, associated with Areobindus (506),[5] a silk at Boston, probably to be assigned to the last quarter of the fifth century,[6] and a marble table from Apamea in the Damascus Museum,[7] dated to the second half of the fourth century but perhaps rather later, may all be noted. The Florence ivory has been associated with Constantinople by Delbrueck, and the evidence of the Great Palace mosaic supports his suggestion, rather than that of Peirce and Tyler, who regard it as western. There can be little doubt as to the Constantinopolitan origin of that in the Louvre.

A floor with animals and birds enclosed in squares, at Nicopolis in Greece, would also seem to be related to the Paradise theme, though Kitzinger has suggested that the idea has here been 'Christianized' into a depiction of the earth, with everything that breathes and creeps.[8] The floor is probably to be dated to between 525 and 550. But even if the birds and animals show a distant relationship to those at Constantinople, the disposition within geometrical frames puts the floor into quite

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[1] A. Merlin and L. Poinssot, 'Deux mosaiques de Tunisie à sujets prophylactique', *Monuments Piot*, xxxiv, 1934, pl. IX. The central figure is identified as Bacchus, but should be the Good Shepherd.

[2] Levi, pls. LXXXVII-LXXXIX and CLXXIV-CLXXV.

[3] M. Gough, 'A temple and church at Ayas, Cilicia', *Anatolian Studies*, iv, 1954, p. 57.

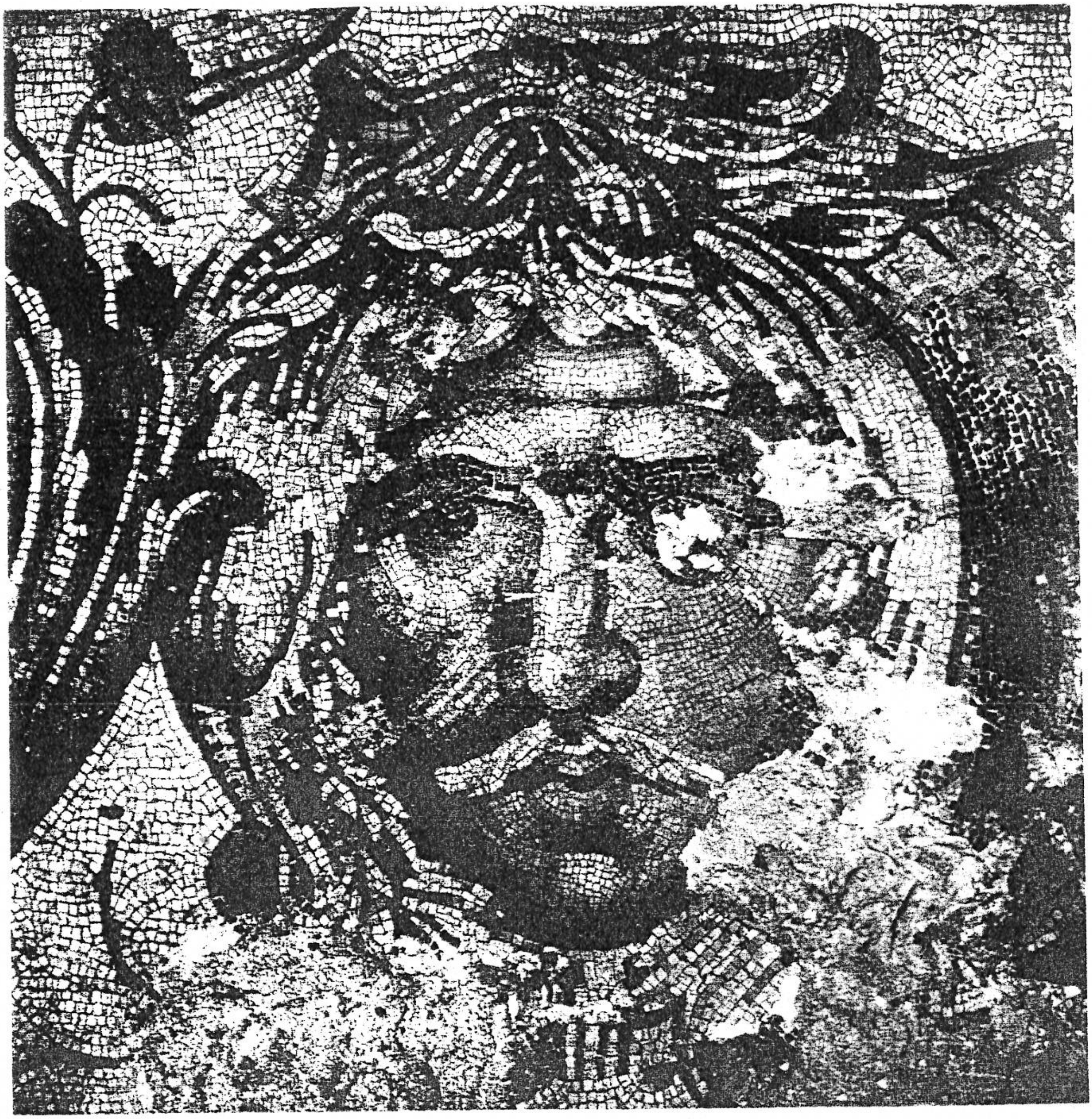
[4] Peirce and Tyler, *op. cit.*, i, pl. 124. See also Delbrueck, *Die Consulardiptychen*, 1929, pl. 13.

[5] Delbrueck, *op. cit.*, pl. 69.

[6] Peirce and Tyler, *op. cit.*, i, pl. 162, *a*.

[7] Séhin Abdul-Hak, *Catalogue illustré du Département des Antiquités Greco-Romaines au Musée de Damas*, 1951, p. 74, no. 1.

[8] E. Kitzinger, *Dumbarton Oaks Papers*, no. 6, 1951.



MOSAIC · GREAT HEAD (AT A, A1)

a distinct category, which does not really concern us here. One other geometric floor must, nevertheless, be noted, namely that of the basilica at Aquilea. The style is more linear, and the 'all-over' character of the design is quite distinct, but the animals and birds must have been drawn from the same repertory. The floor is to be dated to the early fourth century.[1] Other mosaics in a second church at Aquilea, which date from the time of Theodosios, are again comparable. The pattern consists of animals in circular and oval frames. Individual figures in the floor of a building known as the Hammam at Beisan must also be noted, though once more they are enclosed in circles.[2] Here not only are the animals comparable, but there are also human heads at the corners of the border not unlike those of Oceanus at Constantinople. The floor is to be dated to about 530 on archaeological evidence.

11. *Conclusions on the Stylistic Evidence*

Animal pavements which are similar in many respects to portions of the Constantinople floor thus occur over a wide area. Though they very often bear similar motifs, however, the African floors as a whole are in a distinct style. They nearly always show a marked 'horror vacui' and their compositions are invariably very crowded; the floral motifs are over-profuse and of a different type from those at Constantinople; the techinque is much coarser. Again, the figures often assume that rather exuberant, florid manner which at a later date becomes a characteristic of Coptic art,[3] and tend to lack the elegance and grandeur which is so typical of Constantinople. Just as a Coptic ivory is quite distinct from a Byzantine one in style, so are most of the North African mosaics distinct from the pavement of the Great Palace at Constantinople. This North African style of the fifth century is clearly exemplified by a mosaic bearing a personification of Carthage in the Louvre (no. 2999), and the rather heavy colouring, which in the costume includes black, blue, red, green, yellow-green and olive, is also characteristic. In fact, though North Africa was certainly an important centre for the production of mosaic floors, and though certain motifs, especially animals and birds, probably originated and were certainly much developed there, and were copied in other areas, notably in

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[1] The mosaics were done for Bishop Theodore, who died in 338. The church was destroyed by Attila in 452. See J. Fink, *Der Ursprung der ältesten Kirchen am Domplatz von Aquileja*, 1954.

[2] M. Avi Yonah, 'Mosaic Pavements at el Hammam, Beisan', *Quart. of the Dpt. of Ants. of Palestine*, v, 1936, p. 11 and pls. XIV-XVII. The cubes are large, averaging 120 to the square of 10 cm., but the colours are elaborate and include light and dark blue and light and dark green glass cubes. Mr. Avi Yonah calls attention to the African affinities of the floor. Some of the birds are of African types.

[3] This manner is most clearly illustrated by a floor at Sheikh Zoueida in Egypt, which Clêdat dates to the second century. See his 'Fouilles à cheikh Zouède', *Annales du Service des antiquités de l'Egypte*, xv, Cairo, 1915, pls. III, IV and V.

Palestine, there is no reason to suppose that North Africa exercised any direct influence on Constantinople.

Parallels between the Constantinople work and Syria are a great deal more important, for they are to be traced not only as regards motifs of the design, but also in style. Figures, animals, trees and hunts or combats are closely similar in both areas. Nowhere is a wider repertory of trees to be found than at Constantinople in the fifth and Damascus in the eighth century. The animal combat and hunting scenes attest the links, for there are several of these at Constantinople, and they were very popular at Antioch and appear again at Apamea. Morey attributes their popularity at Antioch to Persian influence,[1] and Lassus also stresses the importance of Persian elements.[2] He thus regards the depiction of a man on foot attacking an animal with a spear as derived from Parthian art, while the mounted hunter with spear is again an oriental conception, even if the figures wear classical costume. But these hunters were absorbed into Roman art at quite an early date, and in due course they become associated with the circus games, and this represents a further Romanization of the idea. At Antioch the beasts all belong to the Sasanian repertory, and Lassus notes that the trappings and harness are also of Sasanian type. At Constantinople, on the other hand, most of the representations of the combat or hunt theme had already been Romanized; this is especially so in the representation of the two gladiators spearing a tiger (*G.P.*, pl. 37). The mounted hunter with spear (Pl. 45) is perhaps rather closer to an oriental prototype, while the rider shooting backwards (*G.P.*, pl. 39) is a definitely eastern theme, though it too had been widely adopted in Roman art.[3]

The combats between winged monsters and other animals (*G.P.*, pl. 38) were again probably ultimately of oriental origin, but these themes had become well-nigh universal in the Hellenistic world long before the Constantinople mosaic was conceived, so that the inspiration may well have come by way of Hellenistic models.[4] Certain definitely oriental features which are marked at Antioch are, however, absent at Constantinople. Such are the beribboning of animals in the Sasanian manner,[5] the accentuation of the rhythmical elements in the composition, or the love of all-over or repeat patterns like those of a textile, which appear in the borders of some of the Antioch mosaics such as the lovely Phoenix pavement now in the Louvre. Such oriental elements in these themes as are present at Constantinople are there as part of a fused and generally accepted idiom which had become universal in the east Mediterranean world by the third century and which continued both there and further to the west for many centuries to come. The amazing way in which many of the themes survived is illustrated by the floors of Lescar in the Basses Pyrénées,[1] Germigny des Prés,[2] or Thiers in the Puy de Dome,[3] where animal combats and hunts survived right into Romanesque times. Similar motifs also appeared in manuscripts from the ninth to the twelfth century; the Physiologos of Berne may serve as an example. It dates from the ninth century, but follows a second century original fairly closely.[4] From such manuscripts as this the beasts passed to that popular form, the western Bestiary. At an early date the animal themes were perhaps also used for the illustration of classical texts; the illustration to Georgic III on folio 44^{v} of the Vergilius Romanus in the Vatican, which depicts a mare and foal, with sheep and goats eating greenery, may be cited.[5] It is probably to be assigned to the fifth century.[6]

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[1] *Mediaeval Art, New York*, 1942, p. 38.

[2] 'Le thème de la chasse dans les mosaiques d'Antioche', *Arte del primo Millennio*, Vigliongo, 1950, p. 141.

[3] For his position compare the bowman on a plate in the Oxus Treasure in the British Museum of the fourth century. O. M. Dalton, *The Treasure of the Oxus*, London, 1926, no. 201, pl. XXXI.

[4] They occur, for example, in the mosaic floor at Olynthus, about 400 B.C. See D. M. Robinson, *Mosaics, Vases and Lamps*, in *Johns Hopkins University Excavations at Olynthus*, pt. v, 1933, pls. III and 12.

[5] For example, the House of the Beribonned Lion, Levi, pl. LXX, or the ram's head border of the House of the Phoenix, now in the Louvre, Levi, pl. CXXXIV.

Another type of animal composition, but one quite distinct from these oriental or orientalizing ones, consists of a picturesque landscape in which animals play an essential part. The scenes of goats with their shepherds (*G.P.*, pls. 30, 35 and 36) or of horses grazing (*G.P.*, pls. 30 and 46) belong to this type, and they may be compared with a painting now in the Vatican which came from Hadrian's villa.[7] This type of composition had its origin in the so-called picturesque style which many trace to Alexandria, but which is best exemplified for us by paintings at Pompeii or elsewhere in Italy. Few examples of this type have survived from early Christian times. In the Pompeiian ones the landscape itself of course plays an important part, whereas at Constantinople it has been almost completely eliminated.

The exact chronological position of the Constantinople floor in this long story can, on the basis of iconographical evidence, only be determined within very wide limits, since changes were accomplished but slowly, and owing to the use of sketches or copy-books the themes were adhered to with very great conservatism. The most that can be said, on the evidence of style, is that the floor is later than about 400 and earlier than *c.* 530 (San Vitale). A date between 450 and 500 seems, on the stylistic evidence, the most likely.

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[1] M. Gieure, *Les Eglises romanes en France*, Paris, 1953, pl. 67. See also Gauckler, *op. cit.*, no. 412, plates fasc. 2.

[2] A. Grabar, 'Les Mosaiques de Germigny des Prés', *Cahiers Archéologiques*, VII, 1954, pp. 174 ff.

[3] H. Stern, 'La mosaique de l'Eglise St. Genès de Thiers', *Cahiers Archéologiques*, vii, 1954, p. 185.

[4] Helen Woodruff, 'The Physiologos of Bern', *Art Bulletin*, xii, 1930, p. 226.

[5] *Codices e Vaticana selecti phototypici expressi. Series Major*, II, Rome, 1902. Picturae ornamenta complura scripturae specimina codicis Vaticani 3867, qui codex Vergilii Romanus audit.

[6] It has been dated both to the fifth and the sixth century. The most recent dating is that of C. Nordenfalle, *Early Mediaeval Painting*, Skira, 1957, p. 98, to the early fifth century.

[7] G. E. Rizzo, *La Pittura Ellenistico-Romana*, Milan, 1929, pl. CLXXXIV.

What does emerge quite clearly, however, is the very individual character of the work. The floor has its relations in practically every part of the Mediterranean world. But they are cousins rather than brothers, collaterals rather than direct ancestors. The texts tell us that artisans from many areas were assembled at Constantinople by the early emperors. Our floor shows us that ideas, motifs and styles were similarly introduced, and our floor no doubt owes a direct debt to those men and those motifs. But the style was rapidly transformed into something distinct, something that was essentially Constantinopolitan, and our floor may be counted as one of the first instances that we now have of this essentially Constantinopolitan art.

C. TECHNIQUE

The manner in which the ground and the tesserae were prepared, as well as that in which the work was divided between groups of craftsmen, has already been fully discussed by Brett (*G.P.*, pp. 8, 64 and 87). One additional point may, however, be added to his description; it is that the colour scheme appears to have been sketched out in paint on the plaster before the cubes were set. This practice was a fairly general one in later times; it was, for instance, used by the mosaicists of Hagia Sophia from the tenth century onwards.[1] It would not appear to have been quite so usual at an early date however, for in the wall mosaics of the baptistry of S. Lorenzo at Milan, of the later fourth century, the scheme appears to have been outlined in black only. Elsewhere in Italy the 'form' of the pattern was usually indicated, but in a monochrome wash rather than in colour.[2] Perhaps the manner of execution was determined by the character of the mosaic, the freer, more impressionistic type of setting which was usual in Italy, for instance, being left to the actual mosaicist, whereas when colours were put in in wider masses, the scheme was first indicated in paint. This, in any case, would be a logical explanation.

Since the publication of the first report on the mosaics of the Great Palace it has on occasion been questioned whether certain technical peculiarities of the mosaics there might assist in the problem of dating or in the determination of origins. Perhaps the most distinctive characteristic which at first sight might seem important in these connections is the manner of setting the background in a scale or fan pattern. This technique is certainly not a usual one in mosaics of the first few centuries of Christendom. But it was equally certainly very widespread both as regards date and locality. The earliest examples are at Pompeii[1]; the system is next to be seen in a mosaic from Utica in North Africa, now in the British Museum[2]; it was used in a mosaic of the third century from Leon in Spain, now in the Archaeological Museum at Madrid,[3] and we see it again in a few of the Antioch mosaics,[4] as well as in some fragments of the sixth century at Samaria-Sebaste.[5] At a much later date the scale pattern was used, with very telling effect, in the lovely panel of the Deesis in the southern gallery of Hagia Sophia.[6] The degree of finesse of technique in these examples is, however, except for the Hagia Sophia work, in no way comparable to the Constantinople floor, and in the light of the evidence that is at present available, the fan setting seems to have little significance with regard either to dating or to the problem of influences and origins.

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[1] Whittemore, *The Mosaics of St Sophia at Istanbul*, pt. ii, Oxford, 1936, p. 110.

[2] Restoration work at Ravenna has shown that this was the practice there and it was also done in early work in St. Peters: see J. C. M. Toynbee and J. B. Ward Perkins, *The Shrine of St. Peter*, London, 1956, p. 73.

Nor is it possible to deduce much from the degree of the delicacy of the work. At Constantinople both the range of the colours and the small size of the tesserae are outstanding. The great variety and range of the colours has already been noted by Brett (*G.P.*, p. 64); it is further indicated by the colour plates that are included in this volume. The smallness of the tesserae is best indicated by figures. Thus in the main field of the border there are some 200 cubes to the square of ten centimetres; in trees and similar compositions the count is about 250; in the details of the figures it is around 350, and in the details of the faces well over 400; for example, on the chin of the great moustached head (Pl. 50) the count is 420, and on the face of the man being kicked from his mule 425 (Pl. 45). The work at Antioch of the late fifth and early sixth century is very much coarser; details in the House of the Worcester Hunt show about 240 and in the Dumbarton Oaks hunt 230. Only in the earlier work there are counts that compare with those at Constantinople to be found, for example in room 3 of the Constantinian villa, where it is 425.

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[1] *G.P.*, p. 96, n. 9.

[2] Hinks, *op. cit.*, p. 119, no. 45.

[3] Nos. 38·301 and 38·303.

[4] The House of the Buffet Supper (*c.* 425), the House of the Beribboned Lion (*c.* 425), the Church of Machouka (*c.* 500), the Martyrium of Seleucia (*c.* 525) and the House of the Worcester Hunt (*c.* 525).

[5] J. M. Crowfoot, *Churches of Bosra and Samaria-Sebaste*, British School of Archaeology at Jerusalem, Suppl. Papers no. 4, 1937, p. 29 and pl. 17.

[6] Whittemore, *op. cit.*, pt. iv, Oxford, 1952. His dating in the early twelfth century is now disputed, on the grounds of stylistic similarities with early fourteenth-century work in Kariye Camii.

The general tendency at Antioch is thus for the earlier work to be finer and the later coarser, and on this basis the Constantinople floor could be assigned to the first half of the fourth century. But this was not always the case. Work that can unquestionably be assigned to an early date is thus often comparatively coarse, for example a floor recently unearthed in the neighbourhood of the Aqueduct of Valens at Constantinople and now in the Museum of Antiquities, which is probably of the fourth century,[1] while work which is undoubtedly very much later, like the Hagia Sophia Deesis, was often extremely fine. In fact, the size of the tesserae is hardly to be taken as a valid dating factor; it is much more indicative of the wealth and importance of the patron. In out-of-the-way regions, where patrons were poor, the cubes are almost invariably very large indeed; in larger centres their size, though on the whole smaller, depends in the main on the nature of the building to which they belong. Constantinople was the capital, and it would be reasonable to expect to find the best work there. The Great Palace was the hub of the capital itself, and especial care and quality would be called for in work done at that place, under the patronage of the Emperors. The same reason would account for the richness of the colouring.

But one conclusion does emerge from a close study of the mosaics themselves, namely that all the men who worked on this great composition were not equally skilled or equally creative. Even in a commission where the best was undoubtedly demanded it would seem that there was a danger of occasional weakness, and it can therefore be argued that such weaknesses would hardly be likely to occur in the fourth century, when very highly skilled work was being done in several places elsewhere, as in the fifth, when the general quality of work at Antioch, and in other places also, had quite obviously declined.

D. ARTISTIC SIGNIFICANCE OF THE MOSAICS

It has been suggested that as an artistic entity the Constantinople floor is unsatisfactory on account of the isolation of the numerous figures and subjects that go to compose it, in contrast with the clearly defined patterns that characterize the floors of North Africa and most of those of Antioch. Were it not for the border, the subjects, it has been held, would have no more relation to one another than the casual drawings on the pages of an artist's sketchbook. This is, however, a superficial impression; closer study of the floor discloses a definite balance in arrangement, for even if the motifs are not interconnected in subject, they are nevertheless carefully placed and arranged. There are no disagreeable hiatuses, while bridge-pieces, in the form of coulisses, verdure and so on, serve to link or balance the larger themes. There is, moreover, none of that rather unpleasant overcrowding so usual in North Africa. In fact, much thought and great skill must have gone towards the layout of the Constantinople floor.

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[1] H. E. Del Medico, 'A propos d'une mosaique découverte à Istanbul', *Byzantinoslavica*, xvi, 1955, p. 260.

In spite of this, however, it is the individual figures and groups that most clearly attest the outstanding quality of the work. Here little criticism is possible. The charm and the realism of the rural scenes; the brilliant decorative effect of the architectural motifs; the delicate modelling of the trees, their foliage indicated by means of elaborate gradations of green and blue, their trunks by subtle shading; the classical dignity of the figures; the vividness and forceful movement of the animals; the lightness and expressiveness of the birds; the lovely balance of the scrolls; the delight of the flowers and fruits in the border; everything in fact indicates an art of a high order. This appears even higher when the outstanding excellence of the technique is taken into account. The setting of the background as a series of fan-like forms, rather than in parallel lines, in itself serves to lend an air of distinction. This is carried further by the richness of the palette, which was much more elaborate than that of the Antioch mosaicists. But, above all, it is with regard to the details that the mosaic excells, notably in the modelling of the figures, the actual draughtsmanship and the subtlety of understanding. Numerous examples could be cited to illustrate the above points; attention may be drawn to the two birds about to alight on the tree close to the boys playing in the Hippodrome (*G.P.*, pl. 30); to the damaged but outstandingly lovely figure of a mounted bowman (*G.P.*, pl. 39); to the water-mill (*G.P.*, pl. 41), or to the mule which kicks off its rider and the bundles of sticks on its back (Colour Pl. B). Even more effective are some of the details of the border, more especially in the region of the barbarian's head (Pls. 48-50). Curiously enough the modelling and vivacity appear at their best in areas where no attempt has been made to include the actual ground. Where the ground is included, the composition of the floor as a whole tends to suffer; a comparison of plates 30 and 33 of the First Report serves to illustrate this, but the fact is more clearly apparent on the site.

Another important feature of the floor, which has already been noted by Brett, is the poetic atmosphere that dominates throughout. 'The centre of interest', he writes,[1] 'seems to have shifted from the matter-of-fact rendering of rural occupations towards a stressing of the romantic and poetic associations of pastoral life.' This is surely in keeping with the whole basis of Greek as opposed to Roman thought, and constitutes one of the principal elements that distinguish the art of the Hellenistic area from that of North Africa, even when almost exactly the same motifs are depicted. The same outlook is reflected at a rather later date in Paul the Silentiary's poem on Hagia Sophia, when he compares the mosaics of the dome to the stars of heaven and the marble columns and slabs to the flower-bordered streams of Thessaly, to the budding corn and woods thick with trees.[1] We see here not so much a countryman's view as an idealized vision, and we see in the floor a hint of that same preoccupation with the world of the imagination which was soon to develop to so surprising a degree in religious art. Here, in a purely secular decoration, the themes are retrospective, but the manner of their treatment indicates the birth of a new outlook, on the one hand far removed from the prosaic narration of Roman art and on the other from that exaggerated preoccupation with rhythm and decoration characteristic of the East. The fact is made especially clear if one notes those items that are omitted at Constantinople from the repertories that are usual elsewhere. Thus mythological scenes or complicated allegories are absent; there are no architecturescapes in the Pompeiian manner, and no still-lives; sirens, centaurs and similar figures appear rarely, and as it were by chance; the more violent forms of gladatorial fights are not depicted. And again, diapers, interlacing bands, the guilloche and pelta patterns, or stylized repeat patterns of a zoomorphic type were all completely avoided. Nor is there ever an attempt to simulate the appearance of a carpet, or to enliven the compositions with ribbons, jewels or similar eastern appendages. The pavement, in this respect, stands apart. It is not completely late Roman; it is not entirely Syrian; it is not even truly Hellenistic; still less is it oriental. In fact, it is already Constantinopolitan, and is especially significant in that we see in it for practically the first time, even if in embryo, many of the features that were later to become characteristic of the Constantinopolitan style in Byzantine art.

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[1] The Mosaic of the Great Palace in Constantinople', *Journal of the Warburg and Courtauld Institutes*, v, 1942, p. 37.

E. THE PROBLEMS OF DATING

Since the publication of the First Report on the excavations in 1947, the dating around 410 which was there proposed for the mosaic has been queried either in print or, more often, verbally by quite a number of authorities. Some have suggested an earlier date. Thus Professor Schede, who was before the war Director of the German Archaeological Institute at Constantinople, assigned the mosaic to 'the fourth or perhaps even the third century' on the basis of the very classical character of many of the figures. A. M. Schneider, in a long review of the First Report, which was intended for *Antiquity* but was never published, and which is here included as an *Appendix* (see p. 194) called attention to the early character of the floor. Bittel suggested the fourth century, though he admitted that comparative material was too scarce to permit exact conclusions.[1] Gelassi favoured the end of the fourth century.[2]

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[1] Extensively quoted by Lethaby and Swainson, *The Church of Sancta Sophia, Constantinople*, London, 1894, pp. 36 ff.

Others, on the other hand, have considered that a date around 410 is too early, and have suggested that parallels at Antioch and elsewhere support a dating later in the fifth or even in the sixth century. These include C. Mango, the late Ernest Mamboury, who was perhaps more familiar with the antiquities of Constantinople than any other man, Doro Levi and Victor Lazarev. Mango has thus suggested the reign of Marcian (450-475)[3]: Mamboury favoured the late fifth century. Levi compares the Constantinople floor to those of the Megalopsychia (450-460) and the House of the Worcester Hunt (*c.* 525) at Antioch, and suggests that even if the building at Constantinople should be assigned to around 410, the floor might well have been added later.[4] Lazarev compares the motifs of the decoration with those on the group of silver dishes of the sixth or seventh century in the Hermitage published by Matszulewitsch, and with some of the frescoes in Sta. Maria Antiqua in Rome, and states that the floor could easily belong to the mid sixth century.[5]

When the excavations were resumed after the war it was hoped that additional archaeological evidence might be forthcoming that would serve to establish the date beyond any doubt. Although positive evidence, in the shape of closely datable deposits, was disappointingly scanty, the new excavations have established in considerably greater detail the place of the mosaic and its associated structures in the building history of this part of the Great Palace. These results will be further discussed in a following section (see p. 161). But as many points still remain uncertain, it will be useful to present here a summary of conclusions suggested by the foregoing iconographical, technical and stylistic studies.

For the evidence previously put forward by Brett on the basis of his study of the mosaics, which paid special regard to the costumes and styles of hair dressing, the reader is referred to his writings.[1] But it may be added that though Brett's conclusions favour a date around 410, they do not absolutely preclude one some years earlier or a good many years later, for fashions in these things did not change rapidly, and if sketch-books were used, as seems well-nigh certain, old styles could easily have been copied at later dates. The conservatism of the Apamea floor should in this connection be borne in mind; though dated by an inscription to 539, the floor is a great deal more conservative in point of style than that of the Great Palace, and without the inscription as guide one would have dated it to the fourth century. In attempting to reach a conclusion as to dates on stylistic grounds it must therefore not be forgotten that in ancient times, just as to-day, progressive and conservative styles existed side by side at the same time.

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[1] *Jahrbuch des deutschen archäol. Instituts, Archaeologische Anzieger*, vol. liv, 1939, p. 182.

[2] *Roma o Bizanzio*, ii, Roma, 1953, p. 353.

[3] 'Autour du Grand Palais de Constantinople', *Cahiers Archéologiques*, v, 1951, p. 184.

[4] *Antioch Mosaic Pavements*, i, p. 581, n. 101.

[5] *Vizantiski Vremenik*, vii, 1953, p. 373.

Added to this is the difficulty occasioned by the important fact of locality. What is valid for Africa is not necessarily valid for Syria, still less so for Constantinople, and an elaborate system of sequence dating that may be reliable in one place will not necessarily be applicable in another. Again, work done for Imperial patrons at Constantinople tended to be especially distinctive, and there is no doubt that what was done for them was different from what was done for others in the city, and even more so in the provinces, though provincial cities were often in other respects extremely advanced and sophisticated. Sometimes, of course, the regional barriers were broken down, but even when this was the case, as for example in the reign of Justinian, the break-down was usually only of brief duration. Nor were its effects universally applicable, for widely diverse styles could be followed literally in the same building and at the same date. The well-known panels showing Justinian and Theodora in San Vitale at Ravenna are thus rigid, frontal and colourful, and attest the oriental element in Byzantine art, whereas the Christ in the apse is still broadly speaking Roman and the foreground of the same panel, with its flowers and plants, belongs to the 'picturesque' tradition of the classical world. Manners almost equally diverse are to be seen in the floor at Piazza Armerina. Style cannot thus by itself be accepted as a valid criterion for dating purposes.

In the same way, technical quality cannot be relied upon in this connection. The floor of the Constantinian villa at Antioch thus shows almost the same count of cubes to the square of ten centimetres as that at Constantinople, and the work is of equally high quality in both, yet the former pavement, dated as it is to *c.* 323, is, on the architectural and archaeological evidence, unquestionably a good deal earlier than the one at Constantinople. Wall mosaics at Salonica and Ravenna are equally proficient technically, though they belong undoubtedly to the sixth century. Nor was all the work done at Constantinople necessarily of finer quality than all that done elsewhere, as is proved by a floor recently unearthed in the city by Rüstem Duyuran not far from the Aquaduct of Valens. Here the cubes are large, the palette is limited, and the work is generally rather coarse, even though the design is spirited. It has recently been assigned to 367 or 368, and if Del Medico is correct in his reasoning, it is one of the very few dated floors that have come down to us (see p. 150 above). Even if he is wrong, archaeological evidence supports a fourth-century date.

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[1] *G.P.*, pp. 91 ff. *Journal of the Warburg and Courtauld Institutes*, v, 1942, pp. 34-43.

In spite of these reservations, all of which are important, the evidence of style and iconography can, if employed with care, at times help towards a broad dating. Thus certain elements in the scroll pattern of the border of the Great Palace mosaic are not without significance. There is on the one hand a greater feeling for fantasy than in the scrolls of such floors as that of the Constantinian villa at Antioch (*c.* 323), and the disposition and character of the plants is on the other less stylized and less decadent than it is in the House of the Worcester Hunt (*c.* 525) or the House of the Bird Rinceau (526-540) at the same place.[1] The Constantinople scroll assumes in fact a position between the two in respect of stylistic development.

With regard to the main area of the floor, the compositions that show the closest parallels from the iconographical point of view with dated works elsewhere are those of hunting scenes and animals. These abound in the later, but not in the earlier, floors at Antioch. Animal subjects are also more usual on the later rather than on the earlier ivories. Many of the same animals are thus depicted at Constantinople as in the mosaics of the House of the Worcester Hunt (*c.* 525) and the Martyrium of Seleucia (*c.* 525) at Antioch. Trees in these and other later mosaics at Antioch follow the same conventions as at Constantinople, and backgrounds using the same scale pattern are also found there. There is, in these floors, a similar tendency to arrange the compositions in horizontal bands, to omit the ground, and to eliminate shadows. The same tendencies are to be found in the Apamea floor (539) though to a lesser degree.

But though on this evidence these floors are close to that at Constantinople, there are also certain marked differences. The figures are thus more alive at Constantinople, the technique is immeasurably superior, and features of decadence, such as the conventionalized stances, the loose drawing and the unobservant modelling, are absent. The Constantinopolitan artists invariably paid far closer attention to nature than did those at Antioch. A few actual comparisons will serve to show this. The elephant in the Martyrium of Seleucia (Levi, pl. CLXXV) is thus wooden and dead in comparison with that from the Bacchic procession at Constantinople (*G.P.*, pl. 31), while the hunters in the House of the Worcester Hunt (Levi, pl. CLXX) are clumsy and inept compared with those at Constantinople, whose movements are expressive and subtle (Pl. 45, and *G.P.*, pls. 28 and 36). At Antioch the men are invariably bent forward, but look outwards towards the spectator rather than towards the beasts they are pursuing; this is in marked contrast to the hunters in the Constantinople floor, who are preoccupied with the task on which they are engaged. The bowman at Apamea may similarly be compared with that at Constantinople; the latter is a far more convincing and expressive figure. In fact, the characteristics of decadence which are to be seen in the late fifth- and early sixth-century work in Syria are striking by their absence at Constantinople.

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[1] Levi, pls. LVII, XCVI and XLIV *b* and *c* respectively.

But if the Constantinople floor is superior to those in Syria which belong to the sixth century, it is also in some respects superior to the pavements at Piazza Armerina in Sicily. True, there are no hunts or animal combats there of exactly the same type as at Constantinople, but there are numerous animals in the scenes, some of which are not only very closely similar to the Constantinopolitan ones as far as iconography is concerned but which are also close stylistically. A tiger which appears beside a female figure, the Personification of Arabia, in the Piazza Armerina floor is thus very close to the one at Constantinople which is being attacked by two spearmen (Pl. 42, D, E). There are also close technical parallels. The 'palette' is thus often very similar, and in some of the floors glass tesserae of blue and green are employed among the stone ones in an identical manner. The head of Hercules at Piazza Armerina may be compared in this respect.[1] But in spite of these close similarities, there are also features at Piazza Armerina which are distinct and which suggest that the Sicilian mosaics are not only of a different family but are also of an earlier stylistic phase from the Constantinopolitan ones. The ground is thus shown more often than not, shadows are usually included, and 'orientalisms' are absent. The repertory of subjects is again more definitely antique, and the compositions are fuller and more crowded; the style is not dissimilar from that of Antonine work in North Africa, whereas, as has been noted above, the relationships between Constantinople and Africa are mainly superficial.

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[1] B. Pace, *I Mosaici di Piazza Armerina*, Roma, 1955, pl. III. The book is fully illustrated with coloured plates. Pace notes that several distinct hands or schools worked at Piazza Armerina, and the colouring of the work of each tends to vary. Only certain sections of the mosaic can be compared with Constantinople in this respect. For his remarks on the use of glass tesserae see p. 34.

Once again it is not easy to be sure how much the differences are those of date and how much they are due to locality, for both the African work, and to some extent also that at Piazza Armerina, seems to lack something of the spirit of Hellenism that is present at Constantinople. But in spite of this, the impression conveyed by the Piazza Armerina mosaics is that they are definitely earlier than those at Constantinople; the general character is more 'classical' and less 'mediaeval'. Unfortunately, the date of the Piazza Armerina is not definitely established. When the villa was first discovered, Gentili associated it with Anicius Petronius Probus, who was Consul in 406,[1] and Pace also favoured a date around 400. L'Orange, on the other hand, suggested that the mosaics were an intrinsic part of a villa set up as a retreat to which the Emperor Maximian retired, and that would give a date around 300.[2] Though Gentili has now adopted L'Orange's view, this early dating has been much criticized, and one around 400 has been fairly generally accepted.[3] On that basis one would tend to place the Constantinople floor after rather than before the middle of the fifth century, but on the evidence of Piazza Armerina it is impossible to be more precise.

Another source of evidence which deserves consideration is that of the wall mosaics. An examination of these shows that there were marked overlaps in style, and that though work which was classical was being done around the middle of the sixth century in one place, in others, not necessarily far removed, decorations were being set up which were already essentially Byzantine. Though their iconography and subject matter is quite distinct from those of our floor, some of the wall mosaics may be usefully compared, if only because they are in many cases firmly and definitely dated.

The earliest of the large-scale subject mosaics that we know are probably the panels that now adorn the piers of the nave in Santa Maria Maggiore in Rome. They were at one time associated with Pope Liberius (352-366)[4]; more recently they have been attributed to Pope Sixtus III (432-440),[5] and this conclusion is the more likely. There are a few superficial similarities, more especially with the scene of Moses' vision. But the compositions of the Roman works are much more crowded, their backgrounds are filled in with detail, the animals that appear show little of that feeling for naturalism which is so important at Constantinople, the scale is much smaller, and the technique is quite distinct, in that the cubes are set not in groups of graded colour, but singly, in juxtaposition with cubes of other colours, like the brush marks in a pointilliste painting. Moreover, these mosaics belong to a conservative trend, in that the ground is indicated in a fully naturalistic way and cast shadows are clearly shown.

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[1] In *Notizie degli Scavi di Antichità*, Academia dei Lincei, cccxlvi, 1951, p. 332.

[2] 'E un Palazza di Massimiano Erculeo che gli scavi di Piazza Armerina portano alla luce?', in *Symbolae Osloenses*, xxix, 1952, p. 114.

[3] See Pace, *op. cit.*, p. 111, appendix. It is also possible that the Piazza Armerina mosaics are not all of the same date and that those where glass tesserae are used, like the Hercules head, are later than those with hunting scenes or bathing girls. The style of the latter is more consistent with a date around 300 than one around 400.

[4] Wilpert, *Mosaiken und Malereien*, iii, pls. 9 ff. Van Berchem and Cluzot, *Mosaïques chrétiennes*, p. 12 and fig. 33.

[5] Cecchelli, *I Mosaici di Santa Maria Maggiore*, Roma, 1956.

No comparisons with any of the other wall mosaics of Rome need even be suggested, though a few similarities may be noted elsewhere. Thus sheep in one of the mosaics of S. Lorenzo at Milan must follow closely similar models to those at Constantinople, though here again the background is full of detail, and the composition much more crowded.[1] At Ravenna a youthful prophet in S. Apollinare Nuovo[2] may be compared with a boy on the Constantinople floor (*G.P.*, pl. 56), and a tree in San Vitale follows exactly the same convention as the Constantinople trees.[3] But the rendering is different, even so, and would appear to belong to a more advanced phase, and not only to be a manifestation of a distinct art, where the craftsmen were seeking different effects because the works were intended to be looked at from a distance, and not from close to, as was the case with the floor. The San Vitale mosaics were set up between 526 and 547, and even when full allowance is made for the differences between floor and wall, secular and religious compositions, it still seems improbable that the Constantinople floor could possibly be dated so late.

Finally the scroll of the border of the Constantinople floor may be compared with those that decorate the Mausoleum of Galla Placidia at Ravenna (*c.* 450). But the latter has reached the more advanced degree of stylization and formalism proper to wall as opposed to floor mosaics, while the rest of the work in Galla Placidia belongs in the main to the 'Picturesque' style in early Christian art. The Constantinople floor is, on the other hand, quite definitely in that more severe manner which is to be termed the 'neo-Attic'.

One other series of wall mosaics may be brought into the discussion, namely those in the round church which is usually called that of St. George, at Salonica.[4]

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[1] Wilpert, *loc cit.*, i, p. 264, and iii, pl. 41. He identifies the theme as the chariot of the sun above, with shepherds below. The mosaics are to be assigned to the time of Bishop Auxentios (355-372).

[2] Nordström, *Ravennastudien*, being no. 4 of *Figura*, Stockholm, 1954, pl. I (in colour).

[3] P. Toesca, *San Vitale of Ravenna; the Mosaics*, London, 1954, pl. IX.

[4] They have recently been dated to the reign of Theodosios I (379-395). See H. Torp, 'Les mosaiques de St Georges a Thessalonique', in *Proceedings of the Ninth Congress of Byzantine Studies*, Athens, 1955, p. 491; so early a dating has not been generally accepted.

Though there are no close iconographical parallels, the style and technique are akin to the Constantinople floor. Once more we see the manner termed by Morey the 'neo-Attic', and it may be suggested that this manner had become just as characteristic of Constantinople by the latter part of the fifth century as the 'Picturesque' style was characteristic of Alexandria a few centuries earlier. How early it became characteristic it is less easy to say, for the base of the Egyptian obelisk in the Hippodrome, which was set up by Theodosios I in 390, is in a rather clumsier, more expressive style, and lacks the almost reticent elegance typical of the fully developed 'neo-Attic'. By about 400, however, the latter style was already dominant, and examples may be cited in various materials and on a small as well as on a large scale which are both clearly 'neo-Attic' in spirit and also close in style to the mosaics of the Great Palace.

Of the sculptures in this manner the most important is a sarcophagus in the Museum of Antiquities at Istanbul which bears confronted angels at the sides and Apostles at the ends[1]; the rather cold but very accomplished nature of these sculptures is typical. It must date from around 400. No less so, in non-representational as opposed to representational work, is a pedestal adorned with acanthus leaves in the same museum.[2] Examples both in figural and in ornamental sculpture could be multiplied from the large but little-known collection in the Constantinople Museum.[3]

The 'neo-Attic' style of these works appears again on a smaller scale in the ornament of the well-known group of silver plates, the most important examples of which are in the Hermitage at Leningrad; they have been assigned to Constantinople because of 'hall-marks' stamped on their bases.[4] They have been firmly dated to the later fifth and sixth centuries on the same evidence. Several vessels elsewhere may be assigned to the group, notably a plate in the Metropolitan Museum at New York bearing David and the lion.[5] Other ivories show similar traits; most important is a diptych in the Museo Nazionale at Florence bearing St. Paul on one leaf and a representative of Paradise on the other[6]; many of the animals in the latter scene may be compared with those of the Great Palace mosaic. Most 'neo-Attic' of all, however, is the superb silver dish in the Istanbul Museum bearing a female figure, the Personification of India.[1] It has sometimes been assigned to Antioch, but the similarity in style that it shows both with the silver vessels in the Hermitage and with the Great Palace mosaic suggest that Constantinople is a far more likely home.

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[1] The fullest publication is that of J. Kollwitz, *Ostromische Plastik der Theodosianischen Zeit*, Berlin, 1941, pls. 45 and 46. See also C. R. Morey, *Early Christian Art*, Princeton, 1942, fig. 102, and Firatli, *A short Guide to the Byzantine Works of Art*, Istanbul, 1955, pl. V and p. 17.

[2] Peirce and Tyler, *Art Byzantin*, ii, pl. 42.

[3] Material that entered the Museum before 1913 is dealt with by Mendel, *Catalogue des Sculptures*, 3 vols.; some more recent acquisitions are discussed by Arif Mufid Mansel in *Archäologischer Anzieger*, 1931, p. 173.

[4] Matszulewitsch, *Byzantinische Antike*, Berlin, 1929, and *A Burial of a Barbarian King in Eastern Europe*, Moscow, 1934 (in Russian).

[5] Peirce and Tyler, *op. cit.*, ii, pl. 183 *b*.

[6] Delbrueck, *Consulardiptychen*, pl. 5; this ivory has sometimes been assigned to the West, but its close similarity to the mosaic supports its attribution to Constantinople.

Though due allowance must be made for the fact that conservative styles no doubt survived and existed alongside more progressive ones, the evidence that is available does suggest that the 'neo-Attic' style had reached its full development by the later rather than the earlier part of the fifth century. By 550 or thereabouts the controlling influence of Justinian had resulted in the establishment of a completely new manner, the true Byzantine, which we see exemplified in the capitals of Hagia Sophia. It is unlikely that the mosaic decoration of a major portion of the Great Palace, even though of a secular character, would have been in an unduly conservative manner; one would expect to find in such a place not only the best but also the most up-to-date work. Though the early fifth century is not impossible, a date after rather than before the middle of the century seems on the basis of stylistic evidence, the more probable. One may thus conclude that the floor was laid sometime between A.D. 450 and 550. Any more exact conclusion can only be reached on the basis of evidence of a purely archaeological character (see ch. VII).

D. T. R.

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[1] Peirce and Tyler, *op. cit.*, i, pl. 57; Firatli, *op. cit.*, pl. XIV.

CHAPTER VII

THE PROBLEM OF IDENTIFICATION

THE problem of identifying the various structures unearthed during the course of the Walker Trust excavations is far from easy. Indeed, it will only be possible for a final solution to be reached when excavations have been conducted on a far more extensive scale than has so far been possible. The recent excavations have nevertheless produced a lot of fresh evidence; and it is the purpose of this chapter to review in the light of this evidence the various identifications that have already been put forward, and to limit the terms within which the problem may in future usefully be discussed.

In proposing identifications hitherto, two important points seem sometimes to have been forgotten, namely those of relative chronology and of general probability on historical grounds. Thus, in the first place, the dates at which the various buildings were constructed, reconstructed or demolished are extremely important; it must, for example, be remembered that the mosaics and the Peristyle were certainly no longer visible when Constantine Porphyrogenitus wrote his 'Book of Ceremonies'. In the second, it may be noted that between the time of Constantine the Great and that of Justinian practically the only large-scale additions to the Great Palace that are recorded in the texts are those done under Theodosios II, who built the Bucoleon Palace,[1] and under Marcian, who added what are usually termed his 'galleries'.[2] In view of the very considerable extent of the building complex that has been excavated, there is a *prima facie* probability that one of the major phases of the buildings unearthed by us should be associated with one or other of these rulers rather than with some Emperor who left no reputation as a builder behind him.

The case for assigning the Peristyle to Theodosios II (408-450) was put forward by Martiny and Brett in the First Report on the excavations (*G.P.*, pp. 17 ff.), their conclusions being reached primarily on the nature and style of the mosaic rather than on purely archaeological evidence. There is much to support such a dating, but there are also certain very definite objections. In the first place, excavations conducted subsequently tend to suggest a later date for the Peristyle and the Apsed Hall (see p. 49), and in the second place the only surviving records that refer to extensive building operations by Theodosios concern his work in the area of the Bucoleon Palace. Guilland has recently shown that this palace must have been close to the sea, and not on an upper level,[1] and there is no reason to associate it with our buildings. If Theodosios's work in the one area was recorded, surely there would have been some mention of it, in view of the scale of our structures, in the other?

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[1] J. P. Richter, *Quellen der Byzantinische Kunstgeschichte*, Wien, 1897, p. 311. Preger, *Script. Orig.*, Leipzig, 1907, p. 256.

[2] A. Vogt, *Commentaire*, i, Paris, 1935, p. 136, for full references.

What we know of the character of the Emperor also has some bearing on this point. He came to the throne in 408, at the age of eight. It is hardly likely that so large a complex as the Peristyle would have been set up during his minority, for the structure savours in every way of personal imperial patronage. And when he reached more mature years, his court rapidly assumed the character of a cloister, with pious practices and charitable works as the order of the day.[2] As the Emperor grew, his character developed in the direction, if not of asceticism, in any case in that of puritanism and strict religious observance. 'He mastered the natural instincts of anger, grief and pleasure', and on one occasion led a crowd in the Hippodrome in worship and hymn singing.[3] It seems hardly likely that a man with such tastes would have been the patron responsible for a decoration of so essentially secular a character as the mosaic pavement around the Peristyle court, even if it were associated with a secular building.[4] Theodosios was, moreover, opposed to the circus games, and the gory scenes of animal combats would again surely have been in direct opposition to his tastes. Indeed, the only period during his reign when the execution of such a mosaic would seem to have been at all likely would have been the years of the Empress Eudoxia's ascendency, between her return from Jerusalem in 439 and her departure from the court in 443. She was noted for her classical learning and her love of Hellenism,[5] and a mosaic like that of the Peristyle might have been executed under her influence. Otherwise the reign of Theodosios II seems, on historical grounds, most improbable.

The arguments put forward by Martiny for the identification of the Peristyle as the Heliakon of the Pharos are also open to criticism. It is recorded that the Heliakon of the Pharos was adjoined by the churches of St. Demetrius, the Theotokos of the Pharos and St. Elias, as well as by the Pharos itself. Martiny identified certain structures to the south-east of the Peristyle as the foundations of these buildings. Thus that originally planned by Mamboury, and called by him Db,[1] was associated with St. Demetrius. A second structure, termed by Mamboury Dc, was associated with St. Elias. Adjacent ruins were identified as those of the Pharos, and it was suggested that the unexcavated area between Db and Dc was the site of the church of the Theotokos (*G.P.*, pp. 18 ff).

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[1] 'Le Palais du Bucoleon', *Byzantinoslavica*, x and xi, 1949, 1950.

[2] Bury, *History of the later Roman Empire*, i, London, 1925, p. 214.

[3] Socrates Scholasticus, *History of the Church*, Book vii, ch. xxii.

[4] Floors depicting hunting scenes and other non-religious themes were used in churches till the fifth century, but they were condemned by the stricter churchmen. See St. Nileus of Sinai, *Epist.* iv, 61, to Olympiodorus. *Patrol. Gr.* lxxix, col. 578.

[5] Bury, *loc. cit.*, p. 226.

The excavations conducted since the war do not support these conclusions. Dc cannot possibly be identified as a church, for the building is undoubtedly of early Turkish date (see p. 48). Below it, as excavations made in 1952 showed, the only other structures were a complex of cisterns, apparently of early Byzantine date; their plan bore no resemblance to a church. The adjacent vaults, associated by Martiny with the Pharos, can hardly have belonged to such a structure, because their form is one that could not have supported a tall tower.[2] Further, the great substructures unearthed between Db and Dc in 1952 and 1953 are more suggestive of a throne room than of a church.[3] One would hardly expect to find a secular mosaic in the forecourt of a church, except in very early times. The church of the Theotokos was not erected till after 740, and the main phase of the substructures is certainly a good deal earlier than that (see p. 49).

The question of relative dating also has an important bearing on the problem, which was not taken into account in the First Report. Thus the Peristyle, with its mosaic, can hardly, on stylistic grounds, be dated later than the sixth century. The mosaic was covered over with a marble pavement and the building was entirely remodelled, and it was clearly shown in the First Report that this must have been done at some time later than the reign of Justinian. The church of St. Demetrius was built by Leo VI (886-912); the church of the Theotokos was set up by Constantine V (740-775)[4]; that of St. Elias was erected by Basil I (867-886).[5]

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[1] Mamboury-Wiegand, pp. 33 ff. and pls. lxxxv to lxxxix.

[2] Vogt places the Pharos on a lower level, close to the sea; *Commentaire*, i, p. 182. But Jenkins and Mango dispute this conclusion, on the basis of a close examination of the tenth homily of Photios, and suggest that the Pharos stood to the south-east of the church of the Theotokos, and that this in turn stood close to the Phiale of the Blues. See their 'The date and significance of the tenth homily of Photios', *Dumbarton Oaks Papers*, Nos. ix and x, p. 134, n. 63, and p. 136, n. 82.

[3] The plan is close to that of the Palace of Theodoric at Ravenna, though it is on a far larger scale; see E. Dyggve, *Ravennatum Palatium Sacrum—la Basilica Imperiale per Ceremonie*, Copenhagen, 1941, pl. xi, fig. 28.

[4] The church has sometimes been assigned to Michael III (862-867), but as it is mentioned before that time, the association with Constantine is more probable. See R. Janin, *La Géographie ecclésiastique de l'Empire byzantin*, iii, Paris, 1953, p. 241, and Vogt, *loc. cit.*, p. 104. At a later date the church was sometimes called the Cappella Bucaleonis, but this confusion only arose around the time of the Latin conquest. See R. Guilland, *loc. cit.*, ix, 68.

[5] Ebersolt, *Le Grand Palais de Constantinople*, Paris, 1910, p. 173.

Only the Pharos was a structure of early date.[1] The whole complex cannot thus have been complete before about 880. Yet by that time the Peristyle court in its original state had ceased to exist, and it had, apparently, taken on a form not at all like that of a peristyle. Martiny's identification can thus at best only apply to the restoration, and not the original construction, and even that is improbable. That the Peristyle and its mosaics are to be associated with the Heliakon thus seems well-nigh impossible.

Vogt's suggestion that the Peristyle should be identified as the Phiale of the Greens may next be examined.[2] It is not known when this Phiale was constructed. It was, however, removed by Basil I (867-886) in order to build a church on the site. It would thus seem that the area involved was not very extensive. So far as dates are concerned the identification is satisfactory, for the laying of the marble floor in the Peristyle could well be associated with Basil I. But the excavations disclosed no construction on the site of the Peristyle itself that could be identified as a church, the only buildings approaching this form being the various substructures to the south-east; and these can hardly be regarded as a reconstruction of the Peristyle. The area of the Peristyle itself, even if the porticos were altered, remained unencumbered by later buildings till the sixteenth century, when the arcades of the Araste Sokak (Fig. 1) were built. For these reasons it would seem that Vogt's suggestion must also be discounted.

Another possible identification is that put forward more recently by Mango, who suggests that the Peristyle is to be associated with Marcian (451-457).[3] It is known that Marcian did a good deal of building in the Palace area, and Theophanes Continuatus records that his so-called 'galleries' stood near the great triklinos erected by Basil I and known as the Pentacubiculum.[4] It is also known that in the fifth century the 'galleries' were near the boundary wall of Constantine's palace. The Pentacubiculum formed part of a group described by Theophilus, which also comprised the Trichoncos and the Sigma, to the north of the Chrysotriclinos. In the opinion of Vogt the location of these buildings cannot have been far from the site of the present excavations, though some of them were probably higher up the hill and closer to the Hippodrome.[5] The galleries might thus have stood almost exactly where the excavations were undertaken, for the limit of Constantine's palace was certainly not very far from there. This suggestion is supported by another fact. When Basil I reconstructed this area, it is stated that 'he built at the extremity of the Peridromos of Marcian the shrine of St. Peter, in the form of a final tower' (ὡς ἀκροπύργιον). This was in all probability a structure of several storeys, in a dominating position.[1] What position could be more dominating than one close to the great substructures beyond the Peristyle, where the ground not only falls rapidly towards the sea but where the contours also turn to form a promontory? The substructures that survive here prove that buildings of more than one storey were usual in the area, and the contours show that there was always an angle at this point.

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[1] Unger, *Quellen*, p. 226.

[2] *Echos d'Orient*, xxxv, 1936, p. 436. See also *Livre des Cérémonies, Commentaire*, ii, Paris, 1940, p. 105. In a later study he associates Mamboury's Db with the church of the Virgin of the Metropolis, which was destroyed by Justinian II in 694. See *Echos d'Orient*, xxxix, 1940-42, p. 78.

[3] 'Autour du Grand Palais de Constantinople', *Cahiers Archéologiques*, v, Paris, 1951, p. 182.

[4] Bonn edn., p. 335.

[5] *Commentaire*, i, plan.

It does, therefore, seem very likely that one or other of the building phases on the site of our excavations is to be associated with Marcian. The problem is which? Did he build the Peristyle and the Apsed Hall beyond it, or was he responsible for the earlier phase, namely the Paved Way and the 'greenstone' substructures (see p. 49 ff.)?

Neither solution presents any inherent difficulties. The Paved Way has more or less the form of a gallery, and although the 'greenstone' construction to which it led is too fragmentary for any clear assessment of its original form, there is certainly nothing in the surviving remains to indicate that it could not have been similarly described. An identification of the Galleries with the later building phase, that of the Peristyle and the Apsed Hall, is, however, equally plausible, and one might cite in support of this a suggestion made by Labarte in his reconstruction of the Palace. He interprets the 'galleries' as being in two distinct parts, the 'galleries' proper, the περίδρομος, and an exterior passage, τὰ ἔξω διαβατικά. He suggests that the former took the form of a sort of covered walk, bounded on one side by a wall and on the other by columns, with a court or similar open space beyond.[2] The word διαβατικά implies something that can be crossed or passed through, not necessarily only a long gallery. The term would thus be applicable to a courtyard of the type of our Peristyle, and not only to a gallery in the form of a passage, as Janin implies.[3] But on the other hand the ’ἔξω διαβατικά might well have been an exterior gallery at the edge of the upper terrace, overlooking the sea, and corresponding with the 'greenstone' structures that antedate the Apsed Hall. It is indeed significant that painted plaster was found in this very area, built in behind masonry of a later phase, but indicating that at one time this must have been the outer end of the terrace (see p. 39). In that case, the περίδρομος would be identified as the Paved Way.

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[1] Mango, *loc. cit.*, p. 182.

[2] Labarte, *Le Palais Imperial de Constantinople*, Paris, 1861, p. 215.

[3] *Constantinople Byzantine*, p. 117. He calls the διαβατικά 'Les passages de Marcien'.

It is thus evident that literary evidence alone is not enough to enable us to decide which of the two successive buildings, the Paved Way or the Peristyle, was the work of Marcian. Are the results of the excavations more explicit? On this point, unfortunately, the mosaics and the structure which they adorned do not speak with quite the same voice. So far as our admittedly incomplete knowledge of the mosaics of this age permits us to generalise, it would seem that the stylistic parallels discussed in Chapter VI, although they do not preclude a date as late as the sixth century, certainly tend to favour one within the limits of the fifth. On the other hand the evidence afforded by our study of the structure points firmly towards the sixth, here too our knowledge is too limited to permit certainty, but the unfinished capitals stratified below the mosaic floor, of the south-west portico (see p. 16), the substantial use of 'greenstone' in and even before the Paved Way phase (p. 49), and the close general resemblance of the building techniques employed in the substructures of the Apsed Hall to those used by Justinian's architects elsewhere in Constantinople, all combine to present a formidable case for assigning the Peristyle and the Apsed Hall to the sixth century, while their predecessors, the Paved Way and the 'greenstone' structure would fall somewhere around the middle of the fifth. In short, if one or other of the buildings revealed by our excavations is to be identified with the Galleries of Marcian, on the evidence of the mosaics this could well be the Peristyle and its mosaics, whereas the more direct evidence of the structure and the capitals points decidedly to the Paved Way.

The dilema is more simply stated than resolved; indeed on present evidence it would be unwise to attempt to draw any final conclusions. What can legitimately be stated is that if the Peristyle and its mosaics are the work of Marcian, the Paved Way and the building below the south-west portico can have preceded it by only a very few years; on a site such as this there is nothing inherently improbable in the replacement of a building very soon after its erection. The oldest buildings on the site of the Apsed Hall are probably not very much older again, though the massive robbed wall beneath the vestibule of the Apsed Hall (p. 28) may well go back to the fourth century or possibly even earlier. If, on the other hand, it is the Paved Way that is the work of Marcian, the Peristyle and the Apsed Hall may well be quite considerably later. The texts do not help us. All that can be said is that any Emperor down to Justinian (527-565) or his immediate successors might have been responsible for the work. Justinian himself, who rebuilt a part of the Palace, the

Zeuxippos, decorating it with a mosaic depicting the victories of his general Belisarius, and who incorporated the Hormizdas within the circuit of the Palace,[1] would seem to be an obvious candidate, were it not that we are unusually well informed about his building activities, so that the erection and decoration of so considerable an edifice as the Peristyle and the Apsed Hall is unlikely to have escaped mention. Another possible candidate is Justin II (565-578), who built in the area and was responsible for the famous Chrysotriklinos. It would indeed be tempting to associate the Apsed Hall with this structure, did we not know that this was octagonal in plan, akin to the church of Sts. Sergius and Bacchus nearby.[2] But this was perhaps not his only work in the area, and the possibility that he was also responsible for the Peristyle and its mosaic floor cannot be discounted.

D. T. R.
J. B. W. P.

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[1] R. Janin, *Constantinople Byzantine*, Paris, 1950, p. 334.

[2] See Vogt, *Commentaire* i, p. 8, for references.

CHAPTER VIII

THE BUILDINGS TO THE NORTH OF THE BUCOLEON HARBOUR CALLED THE 'HOUSE OF JUSTINIAN'

[*Excavated in* 1953 *by J. B. W. P. and G. U. S. C. Surveyed by G. U. S. C.*]

THE ruined Byzantine building which is known as the 'House of Justinian' forms a small part of the complex of structures associated with the Bucoleon Palace. The notes which follow are concerned with the 'House of Justinian' alone and therefore cannot be regarded as anything more than a very small contribution to our knowledge of the area as a whole.[1] At present we do not even know how far the Bucoleon Palace extended, but it is obvious that there were chambers of a monumental character to the west of the 'House of Justinian' and probably also to the north and east of it. These still await detailed study. In the present notes we have concentrated on results obtained by excavations beside the 'House of Justinian' itself and the city-walls on top of which it is built. The chief merit of what is now presented lies in the identification of two distinct phases in the building of the sea-walls, and of two other distinct phases in the construction of the superimposed palace buildings. (For general plan and elevation see Folder D.)

The Bucoleon was an artificial harbour. Its north and west sides were bounded by the city-walls, which form a re-entrant angle at this point, and it is likely that there was a breakwater protecting it from the sea to the south, as is indicated in Fig. 33, although there is no direct evidence for this.[2]

The 'House of Justinian' itself stands beside the sea to the north-east of the projection bounding the Bucoleon harbour. What we see to-day seems to comprise a kind of loggia, standing on top of the city's seaward walls and facing toward the

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[1] For a discussion of the palaces in this area, see R. Guilland, 'Le Palais du Boukoléon', *Byzantinoslavica*, x, p. 6, and xi, p. 61.

[2] A. Van Millingen, *Byzantine Constantinople*, London, 1899, p. 269, says that there were two jetties, citing Bondelmontius' map of 1420 as evidence. But Bondelmontius is extremely sketchy, and if we compare his drawing with the one done a century later by Vavassore it seems much more likely that Bondelmontius' two jetties are meant to represent the walled Arsenal. This arsenal was a shipyard and dry-dock (cf. Braun and Hogenberg, *Civitatis Orbis Terrarum*, 1572, vol. i, pl. 51, which is a revised and clearer version of Vavassore and shows a boat being built in the middle of the arsenal). Apparently Bondelmontius thought of the arsenal as a piece of the sea enclosed in projecting city-walls, while Vavassore and Braun thought of it as a piece of walled land with a ship-basin in the middle. Neither assumption adds to our knowledge, for the Bucoleon lay some way to the east of the Arsenal.

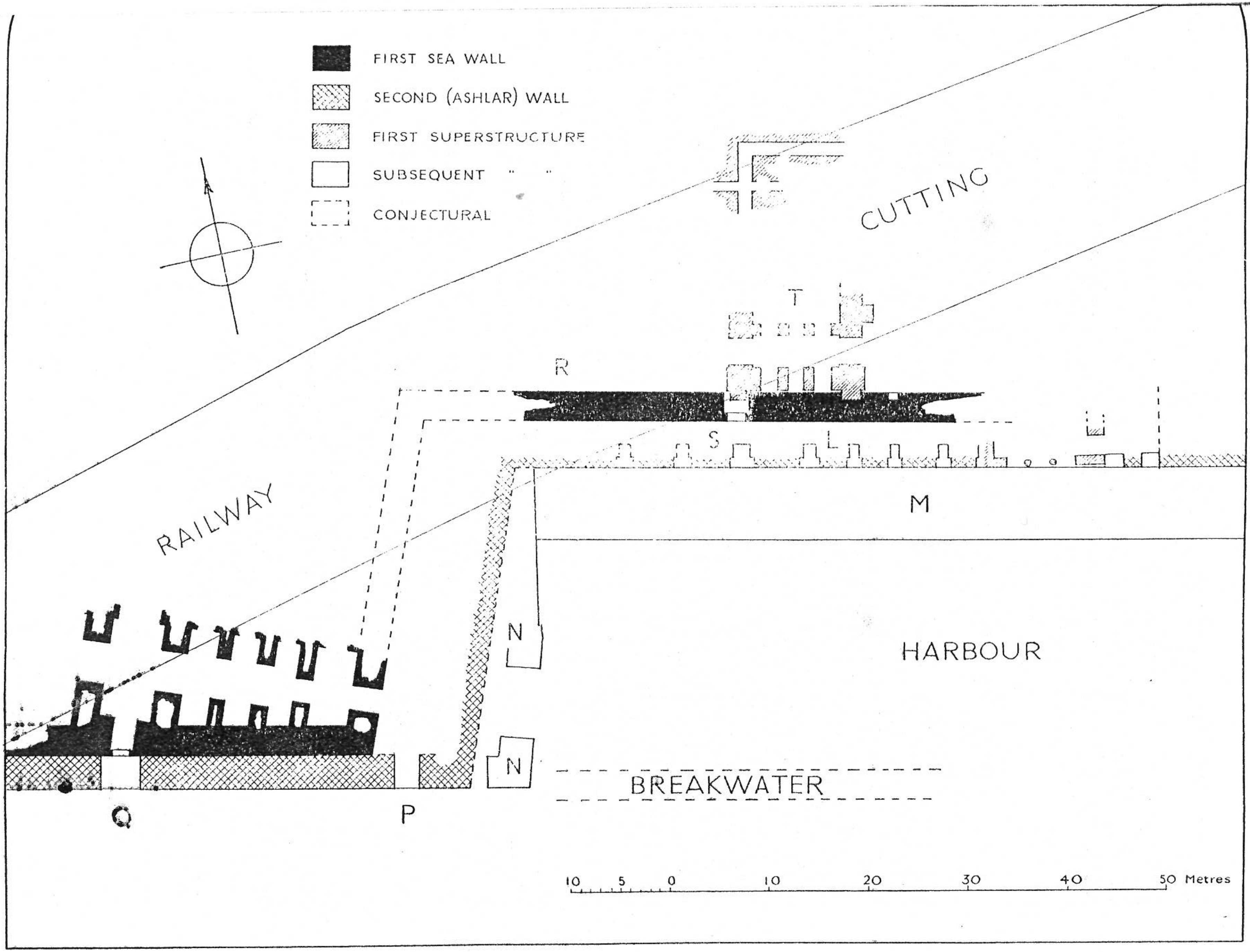
FIRST SEA WALL
SECOND (ASHLAR) WALL
FIRST SUPERSTRUCTURE
SUBSEQUENT " "
CONJECTURAL
CUTTING
RAILWAY
T
R
S
L
M
HARBOUR
N
N
BREAKWATER
Q
P
10 5 0 10 20 30 40 50 Metres

Fig. 33. Plan of the Bucoleon Area.

L. Loggia. M. Quay. N. Monumental stair building. P. Small gateway, superseded by N.

south. About half of the façade of this loggia is preserved; it is of brick, enriched with a number of marble door-frames which were obviously culled from more ancient buildings. The doorways opened out on to a narrow balcony overhanging the sea. The brick walls were faced with marble slabs.

A. THE SEA-WALLS

On the north side of the harbour the greater part of the Byzantine city-wall still remains intact. It is a vertical wall with an ashlar face of heavy rectangular stone blocks, greenish-buff in colour, laid in regular courses 40 to 70 cm. high, with intervening mortar joints, 3 to 8 cm. in thickness. The mortar is very hard and white, but given a pinkish tinge by being mixed with small pieces of broken brick and pottery, as is usual in Constantinople. A few large paving-stones half-buried in the shingle and refuse of the beach still indicate the level of the former quay (M in Fig. 33) which bordered the north side of the harbour,[1] and the topmost course of the city-wall rises to 8·3 m. above this level. The ashlar has been deeply eroded by the sea winds and has had to be so much repaired and refaced that the original masonry is to be seen in only a few places. Nevertheless, a stone of superior quality has here and there resisted erosion and shows that the masonry of the repair work was built in the same plane as the original ashlar face. The repairs are executed in small rubble masonry, with the exception of one conspicuous band of square marble blocks, inserted in the wall about two metres above the level of the former quay (Pl. 36, A, and Folders E, F). Close inspection shows that these blocks are really the upper surfaces of a collection of marble capitals, dosseret-blocks and column-bases. Presumably they were built into the wall to give added strength at the level where storm water does most damage. Apart from this row of marble blocks, the present outward face of the sea-wall is of poor-quality rubble masonry, and it is with difficulty that the much-eroded outlines of the original ashlar can be discerned behind the veil of the later repair work.

In one or two places, where the original ashlar has been more deeply eroded than elsewhere, it is possible to see that it is the outer skin of a massive concrete core made of large stones embedded in the same mortar as is seen between the facing blocks. Various kinds of stone were used in the composition of this concrete; limestone predominates, but there is also a good quantity of the very hard grey marble rock which crops out along the seashore near by. Various fragments of earlier buildings were also used in the concrete; for instance many pieces of worked Proconnesian marble were found in the course of tests made in the interior of the concrete core, as well as some pieces of green Thessalian marble and one small piece of green porphyry which seemed to be a fragment of a piece of sculpture.

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[1] Much of the pavement which was visible in 1931, (see Mamboury and Wiegand, pl. xxix), has now been covered up by small fishermen's huts. However, one or two slabs can still be discerned.

The foundations of this ashlar-faced concrete wall (Pl. 37, B) are visible to the east and to the west of the harbour, although in the harbour itself they are concealed by accumulations of debris and by the remains of the quay. Wherever they are to be seen, the lowest courses of the wall consist of vast numbers of white Proconnesian marble column-shafts, laid horizontally on their sides and embedded in the same hard brick-filled mortar as is found everywhere else. The huge quantity of the shafts used suggests that the wall was built soon after the destruction of some important public building, but what that building could have been is at present a matter for conjecture.

The foregoing remarks apply to the wall on the north side of the harbour. The salient in the city-wall on the western side was probably similar in construction, but it cannot be seen now as it is hidden behind the massive structure of the monumental stairway (N on Fig. 33) which led up from the harbour to the first terraces on which stood the Palace. This stair with its immense archways (lofty enough, perhaps, to allow a sailing-ship to pass beneath them) has been studied in detail by Mamboury and Wiegand[1] and is outside the scope of the present study. That it is a later addition to the ashlar sea-wall is clearly shown at the point where the south wall of the staircase building links up with the earlier sea-wall as it continues westwards from the harbour (Fig. 34). The western pier of the great south arch of the stair impinges upon the threshold of an earlier gateway (P) in the ashlar wall, and it is obvious that, wherever the former wall angle may have been located, the monumental stair building must be an addition.

The ashlar sea-wall with its concrete core is not the earliest of the walls which defended Constantinople at this place. Mamboury and Wiegand have already demonstrated this in their study of the little marble gateway (Q in Fig. 33) which stands about 30 m. to the west of the monumental stair building.[2] Here the ashlar wall is seen to be contemporary and of one continuous build with an outer bastion, which is clearly a secondary addition to an inner wall through which the gateway passes. This inner and earlier wall is built of squared limestone masonry and the gateway itself is of marble blocks (themselves re-used). The gateway has a horizontal lintel made out of a window-pillar laid on its side, and there is on this lintel an incomplete inscription which, in the opinion of some, refers to Constantine the Great. The inscribed lintel rests on moulded corbel brackets and is surmounted by a stilted semicircular arch of marble.

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[1] *Op. cit.*, pp. 10-13.

[2] *Op. cit.*, pp. 6-9.

In the course of the Walker Trust excavations in the spring of 1953 another city-wall (R on Fig. 33) which appears to be a continuation of the wall with the 'Constantine' inscription was discovered a little to the north of the harbour, buried inside the ashlar and concrete of the wall which is at present visible. It is not possible to make a satisfactory comparison of the two walls (i.e. the newly discovered one and the 'Constantine' one) because the upper part of one has perished and the lower part of the other cannot be extricated from the mass of concrete which surrounds it. Nevertheless, in so far as comparison is possible, the two structures appear to resemble each other closely. Large limestone blocks were used for the lower courses of each, and the newly discovered stretch of wall has in it a gateway of almost exactly the same design as the one with the 'Constantine' inscription. It therefore seems safe to assume that the wall which was found in 1953 is a continuation of the wall with the 'Constantine' inscription, after a dog-leg bend has brought it into a more northerly alignment.

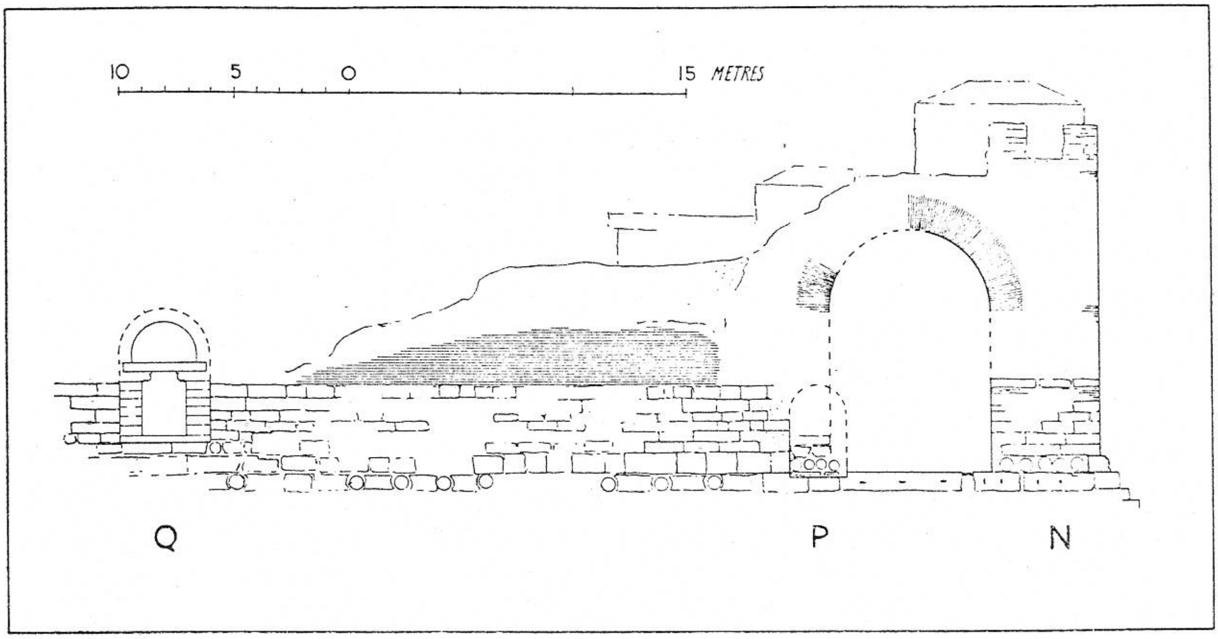

FIG. 34. 'House of Justinian'. The sea-wall to the west of the Bucoleon harbour. N. Stair building. P. Pre-existing gateway. Q. 'Constantine' gateway.

The outer face of the newly discovered wall is about 4·6 m. behind the face of the ashlar sea-wall and its topmost course is buried only a few centimetres beneath the surface of the terrace which the ashlar contains. The masonry of the earlier wall is completely buried within the concrete-filled terrace, the total thickness of the two walls being 7·8 m. (Folders E, F). The earlier wall was 3·2 m. thick and was crowned by a chemin-de-ronde protected by crenellations. Beneath this there was a narrow vaulted passage in the thickness of the wall, 1·05 m. wide, the crown of its vault of pitched brick-work (p. 59). It was illuminated by narrow windows on both sides. When the secondary concrete and ashlar wall was added to the earlier one, the vaulted passage was stuffed with the concrete of the later construction.[1] The earlier wall being thus entirely embedded in concrete might never have been discovered but for the fact that a portion of it on the south side of the passage had been removed, at some unknown date, from the surrounding concrete (its substance is rather less difficult to break up than the surrounding concrete), leaving a narrow trench, upon the concrete walls of which the outlines of the robbed masonry still remain impressed. By this means the 'ghost' of four arched lancet-windows and the brick relieving arch of a doorway could be discerned (Fig. 35; Pl. 37, A). The wall on the north side of the passage and its vault remain in position, and were partly exposed by the removal of some of the concrete with which the passage was stuffed; a laborious process, as the concrete is extremely hard. This clearance revealed the breadth of the corridor and the arch of one of the northward lancets (Pl. 38, A). The wall on the south side of the corridor (i.e. between the corridor and the sea) could be seen in cross-section where it formed the two ends of the excavated trench. It closely resembles the structure of the Theodosian land-walls, being composed of small neatly-squared limestone blocks laid in courses 15 to 20 cm. high and enclosing a core of rubble stone set in the usual brick-filled mortar. Horizontal bands of brickwork passing through the whole thickness of the wall were placed at intervals for the better bonding together of the whole structure.

The limit of our excavations was at one such band, which consisted of five brick-courses, and further excavation through these courses produced the collection of brick stamps illustrated in Fig. 36. All these stamps were found *in situ* and mortared firmly in position near the spot marked (a) on Fig. 35. Altogether

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[1] That it was not unusual to fill up a space between two walls with concrete in this way is suggested by a passage in Procopios, where he speaks of the walls of Martyropolis (Meyafarkin). He writes, (*Buildings of Justinian*, Book iii, sect. 2) 'He built a wall at a distance of four feet from the old wall. He raised this wall to a height of twenty feet, making it in all respects equal in size to the old one; he then filled up the space between the two walls with stones and mortar, thus forming the whole work into one wall twelve feet in thickness.'

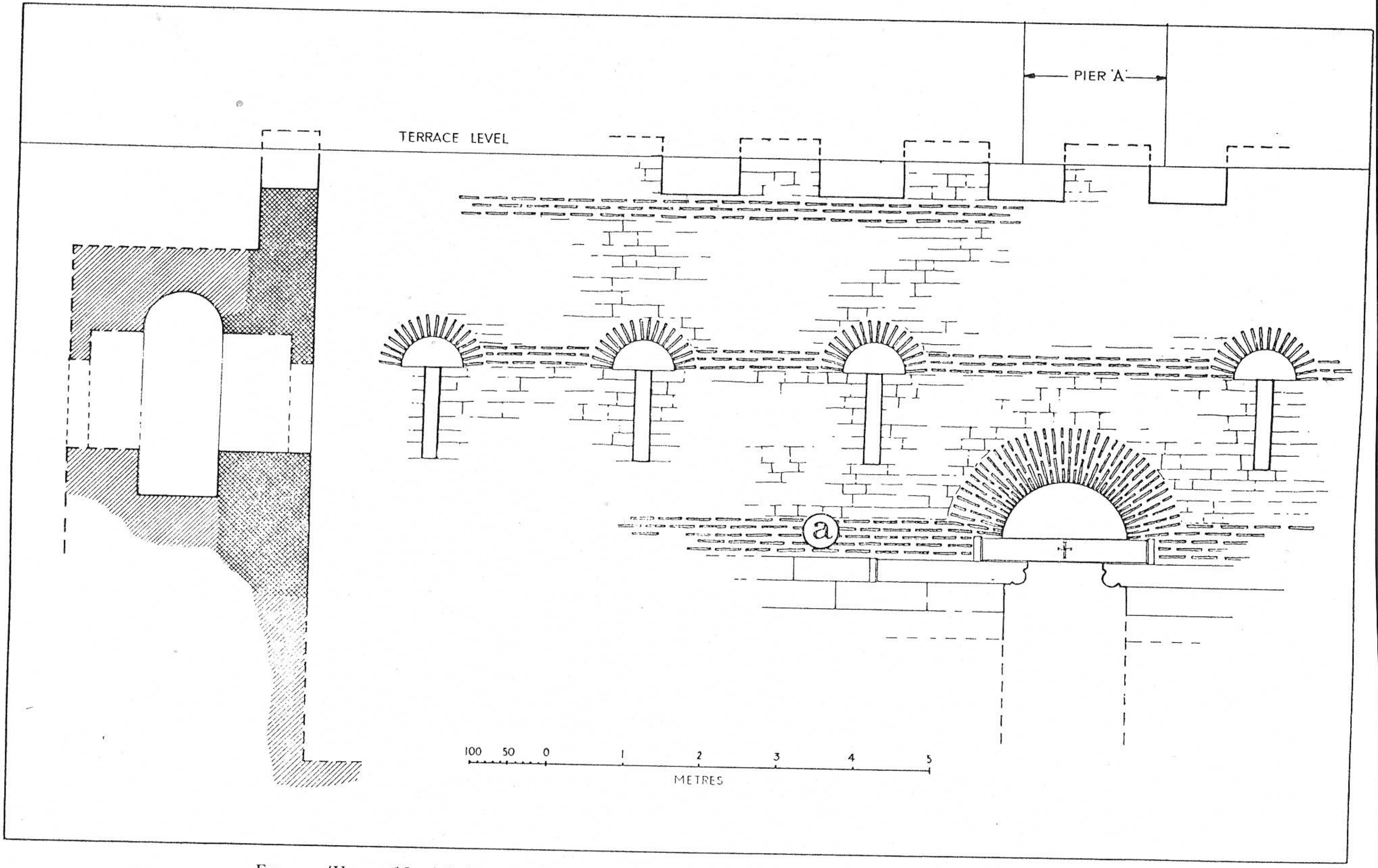
PIER 'A'
TERRACE LEVEL
a
100 50 0 1 2 3 4 5
METRES

FIG. 35. 'House of Justinian'. Cross-section and reconstruction of the first sea-wall. The darker hatching on the cross-section indicates the part of the structure that was excavated.

about fifty bricks were disengaged from the wall, and ten of them bore stamps; no. 1 is the only specimen which was duplicated; no. 2 was broken in the course of excavation, but nos. 3, 4 and 5 were all half-bricks, broken when the wall was built. The same is true of the four remaining brick stamps, which were too badly printed or too fragmentary to be legible. It will be seen that all the stamps except no. 1 were of the one-line type and refer, it seems, to a system of numeration (see p. 105). The presence of several stamps, none repeated, in so small a section of wall suggests that it was built of re-used materials, and the same conclusion is

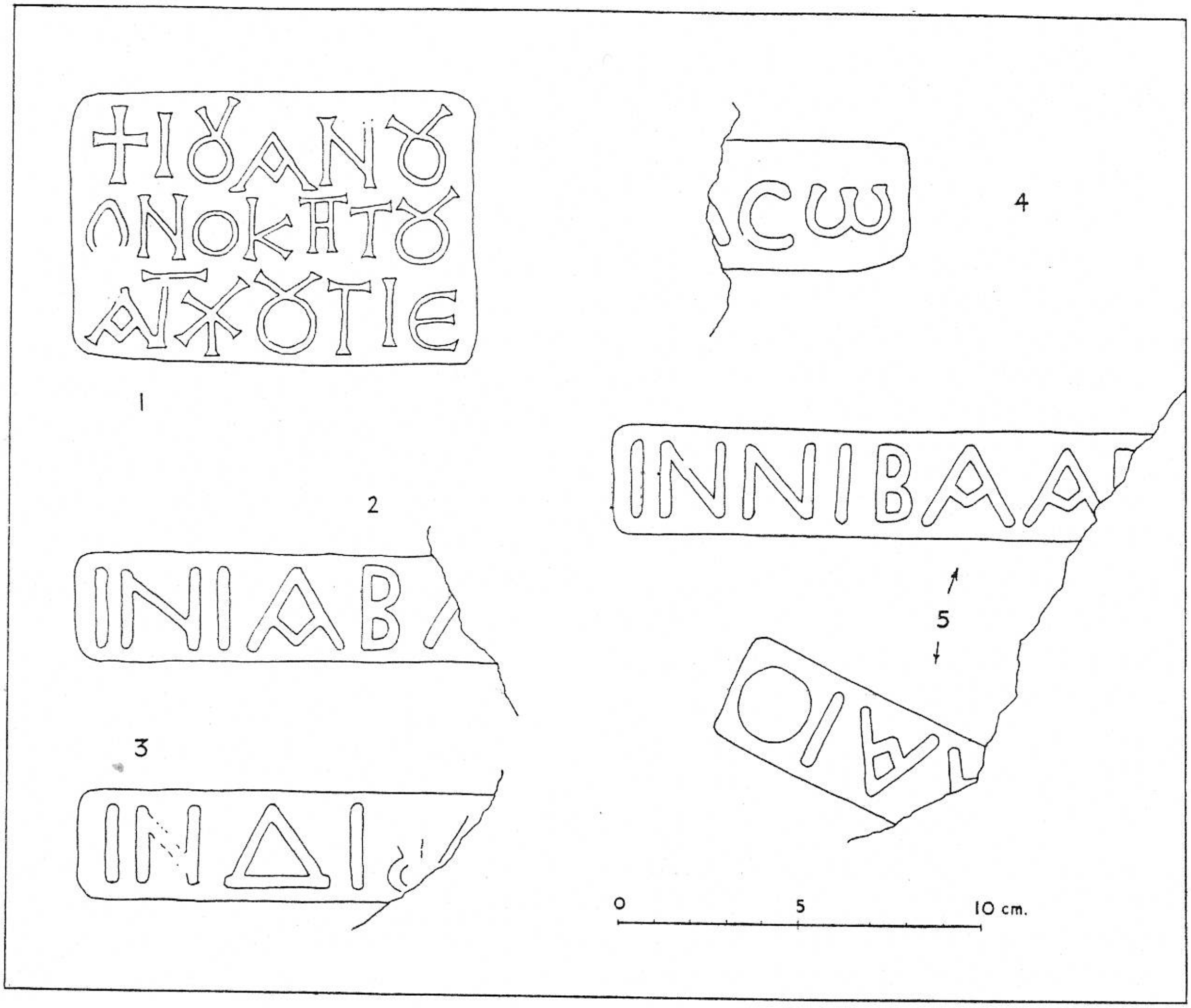

Fig. 36. Brick stamps from sea-wall (mostly re-used material).

implied by the presence of stamp no. 1, which looks as though it belonged to a different period from the others.

Underneath the brick bonding-course the masonry of the inner wall changed from small limestone blocks to the heavy ashlar which, as was noted above, resembles the masonry of the wall in which the gateway of the 'Constantine' inscription occurs. It seems likely that this heavy masonry was used in the lower part of the wall, because there would be a danger of the sea destroying small-scale stonework.[1] Probably the upper part of the wall near the 'Constantine' gateway was also of small limestone blocks, but this has now perished.

The brick relieving arch, which the excavations of 1953 revealed in the form of a negative impression, was the uppermost feature of the gateway in the earlier sea-wall; as noted above, this resembled the gate with the 'Constantine' inscription. Underneath the relieving arch the actual masonry of the gate itself survives, although, being buried in solid concrete, it was, paradoxically, much more difficult to study than the part of the monument which no longer exists. As in the case of the 'Constantine' gate, the relieving arch spanned a semicircular opening, underneath which there was a heavy marble lintel made out of a window-pier lying on its side. Hopes that the lintel would be embellished with an inscription to match the 'Constantine' one were disappointed, and after the massive marble block had been laboriously disengaged from the surrounding concrete mass it was seen to be decorated only with a simple Latin cross in relief (Pl. 39, C).[2] The moulded corbel-stones on which the lintel rested were also disengaged, but again without finding any inscription. The reverse face of the newly found lintel had been the outer face of the stone in its former use as a window-pillar and it still bears the mouldings which then decorated it. This proves that the Latin cross was carved when the stone was first used as a lintel and not subsequently, for, if the lintel had been meant to remain without a cross, the original window-pier mouldings would have been turned outwards. Instead, they were turned towards the middle of the wall and were defaced by the rebate which provided a stop for the leaves of the doors. Inside the rebate the upper hinge-sockets of the doors still remain in position (Pl. 39, D). Each consists of an iron cylinder sunk into the marble and held in position by lead which was poured molten around it. When set, the lead was consolidated by tamping with a spiked tool (Pl. 39, B).

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[1] In the angle-tower where the land-walls meet the sea we also find large ashlar masonry in the lower courses with smaller stones above and an intermediate band of brickwork; see F. Krischen, *Die Landmauer von Konstantinopel*, i, pl. 41 (*a*). Although the inscription at the top of this tower ascribes its construction to the emperors Basil and Constantine (A.D. 976-1025), the lower courses must be earlier. Part of the original masonry survives at the re-entrant angle in the wall beside the adjacent postern gate. This gate has every appearance of being an original Theodosian feature.

[2] The lintel has now been placed with other sculptured stones excavated by the Walker Trust, close to the entrance of the new 'Mosaik Musesi'.

When the doorway was being blocked up with concrete during the construction of the later ashlar-faced wall, two broken acanthus capitals were stuffed into the lunette above the lintel (Pls. 39, A, and 41, A). The capitals are of the so-called 'Theodosian' type and approximate to one from Anchialos illustrated by Kautzsch;[1] one of them bears a mason's mark 'TP'. Many other architectural fragments were similarly re-used in the later wall, at the Constantine gateway for example. They suggest that some quite important building was broken up shortly before the later wall was built.

Although the reverse face of the earlier wall was used to form the northern boundary of the secondary concrete addition, it was not quite high enough, and had to be built up until its north face reached the level of the southern crenellations. This addition to the north face includes a course of large stone blocks and above that at least two courses of smaller stones (Pl. 38, B). It is certain that these extra courses were not part of the original wall because they are higher than the crenellations and are, moreover, perfectly continuous and of one build with the secondary concrete in which the crenellations are embedded.

Summary

It may be concluded that there were two distinct stages in the development of the Byzantine city-walls at the Bucoleon Harbour during the period which preceded the construction of the monumental stairway and the upper building called the 'House of Justinian'. The first stage was the inner wall with its two similar gateways; the second was the ashlar-faced concrete construction inside which the first wall was concealed. The date of the first wall is doubtful; it could be part of the original city-wall of Constantine the Great, but this hypothesis rests only on one fragmentary inscription.[2] A somewhat later date is suggested by the similarity in building technique of the Theodosian land-walls, and this hypothesis receives support from the general design of the newly discovered gate, which, with its cyma-shaped brackets and horizontal lintel decorated with a Latin cross, closely resembles the Rhegium Gate, the Theodosian date of which is attested by an inscription on the lintel.[3] Perhaps the brick stamps will throw more light on the problem when more material of this sort becomes available for comparison. Meanwhile it will be wise to assert no more than that the two gateways and the dog-leg wall between them are likely to have been built before the end of the fifth century.

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[1] *Kapitelstudien*, pl. 24, No. 375, from Basilica A.

[2] Hans Lietzmann thought that the inscription referred to Constantine the Great (Mamboury and Wiegand, pp. 7-9), but Janin seems to find in it no more than a reference to the near-by church of Saint Thomas; see *Constantinople Byzantine*, pp. 279-80.

[3] A. Van Millingen, *Byzantine Constantinople*, London, 1899, pp. 46-7 and 78-80.

The second stage was the burying of the early wall inside the massive terrace of concrete and its ashlar façade. The more westerly of the two gateways in the original wall continued to be used and an opening was accordingly left in the secondary structure, but the eastern gate was completely buried. An important indication of the date of the second wall is found in the masonry of the gap which was left for the western gateway (i.e. the gate with the 'Constantine' inscription). One of the marble blocks bears a monogram of Justinian I.[1] The stone on which this monogram is carved is evidently the spoil of some older building and it shows that the outer ashlar wall dates, at the earliest, from a period when a Justinianic building had fallen into disuse.[2] This means that the outer wall is not earlier than the end of the sixth century and it may be tentatively assigned to the seventh.

A seventh-century date appears to be confirmed by the nature of the material found in the packing of the corridor, which included lengths of such characteristically sixth-century mouldings as the zig-zag brading found in Hagia Sophia[3] and many fragments of wall-veneer in coloured marble, including several qualities that appear to be recorded for the first time in Justinian's buildings in Constantinople and at Ravenna.

B. THE PALACE

We have now to examine the buildings which stand on the terrace which is formed by this double sea-wall (Pl. 36, B).

A preliminary analysis of the plan is enough to show that here too there are at least two distinct phases in the evolution of these buildings; for there can be no doubt that the northern group of piers forming a triple arch (A to D on Folder D) belong to a much more carefully laid-out complex than the irregular buildings which stand to the south of them. The four piers form the southern extremity of a rectangular apartment (T on Fig. 33) which has already been discussed by Mamboury.[4] It seems to have been some kind of corridor which linked the inner part of the palace with the terrace above the harbour. The foundations of piers A to D are of concrete, but above that the fabric of the four piers is entirely of brick except for a narrow marble cornice which lies at the springing of the arches. This cornice (Pl. 40, A) is 12 cm. high and projects 16 cm. from the brick face. The moulding has a crisp, almost brittle, outline, with sharp but not very accurately cut faces, and no attempt is made to hide the marks left by the mason's tool. The dimensions and coursing of the brickwork vary slightly, the bricks being 35-40 cm. long and 3·5-4·5 cm. thick, while ten courses of brick and ten of mortar measure from 98 to 104 cm. in height. The mortar is white and filled with the usual granulated brick and tile fragments. The pointing is smooth and seems to have been worked with a metal trowel; it is almost flush with the brick-face but slightly hollowed, as though the pointing trowel had a rounded nose, and on either side of the hollow the edges of the mortar are 'struck' or chamfered to emphasize the outline of each course (Fig. 37, a). Occasional dowel-holes and fixing-slips show that, in spite of this careful pointing, piers A to D were sheathed in marble. The profile of the marble cornice projects far enough to allow for such a veneer.

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[1] Mamboury-Wiegand, *op. cit.*, pl. XIX.

[2] It is of course possible, though unlikely, that the stones were destined for some building and diverted to their present use in Justinian's reign without having fulfilled their original purpose.

[3] Well illustrated by Schneider, *Die Hagia Sofia zu Konstantinopel*, 1938, abb. 38.

[4] *Op. cit.*, pl. XXVIII, at letter 'e'. Also p. 18.

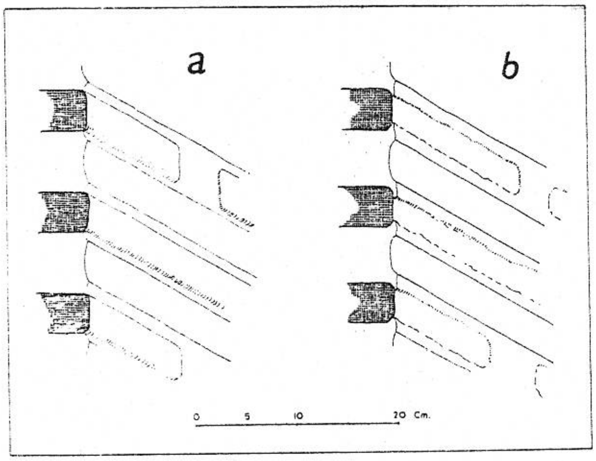


Fig. 37. 'House of Justinian'. (*a*) Brick-work of the first period; (*b*) of the second period.

Above the marble cornice nine horizontal courses of brickwork project gradually forward to form the lower segment of each arch, while the radially set bricks which complete the arch occupy less than half of the total length of the intrados. The three arches between the piers and also other arches which sprang westwards and northwards from pier A were all furnished with deep rebates at the curved line where intrados and spandrel meet, probably to allow room for carved stones outlining the archivolts (Fig. 40).

Although they originally supported arches on the north, east and west sides only, piers A and D have a cruciform plan with a fourth extension projecting to the south. When, at some later date, the vaults of the loggia came to be constructed, the south arms of the two crosses were used to support them; a circumstance which makes it look as though the loggia vaults and the triple arch are contemporary structures. This, however, is not really so, although the false impression is fostered by similar techniques of brick-laying and pointing used in the two phases of construction. Nevertheless, a detailed examination reveals important differences. The earlier work is rather more openly coursed than the later. In piers A to D the courses run at 98-104 cm. per ten courses, while in the later piers it is rarely as much as 100 cm. and sometimes as little as 88 cm. for the same number of courses (in each case counting ten bricks and ten mortar-beds). Close study of the mortar-pointing also discloses differences between the two periods of building. Although a round-nosed trowel was used for each, producing the same kind of shallow channel, the 'struck' margins above and below the channel occur in the brickwork of the first period only, and in the second period the mortar was allowed to spread rather more untidily over the face of each brick (Fig. 37, b). Again, the bricks themselves are on the whole smaller in the later work than in the earlier. Whereas in piers A to D the average length of a brick is about 37 cm., in the later work there are few bricks more than 35 cm. long; and although thickness varies greatly in both periods, the bricks of the later period are, in general, thinner than the earlier ones.

The arms of the cruciform plan which extend southwards in piers A and D were originally matched by extensions from the intervening piers B and C; but it is harder to appreciate these since the extension of B has been completely destroyed, except for one course of brickwork below the present ground-level, and that of C is represented only by a jagged protuberance high up in the pier (largely hidden by a coat of plasterwork and by various patches of repair). The southward extensions did not continue for the whole height of each pier, and above a certain level piers A and D were originally T-shaped instead of cruciform. When the arches of the loggia vaults came to be built on top of the extensions, the southern arms of the crosses were continued upwards to form the spandrels of the vault arches. Nevertheless, in the first form of the building the southward extensions of the four piers A to D stopped off short well below the cornices; in proof of which the cornices continue to follow the T-plan of A and D, and the corresponding south sides of B and C, and so were buried in the brickwork of the loggia vaulting when that came to be built (Pl. 38, c; Figs. 38 and 39).

The original height of the extensions of piers A, C and D can be recognized from the bonding. At the levels where the piers were cruciform from the first, the southward extensions are homogeneous with the rest of the pier and the brick-courses are (or at any rate were formerly) bonded together. Above that level the courses no longer bond together and there is a noticeable gap between the original pier and its southward extension, the spandrel of the secondary vault. In pier D, where the bulk of the pier has been destroyed and only the south arm of the cross remains to hold up the vault, different evidence proves the same story. Here we

FIG. 38. 'House of Justinian'. Part of pier A seen from the south-east. (*a*) The body of the pier. (*b*) The southward extension. (*c*) The secondary vaulting, supported on (*b*).

FIG. 39. 'House of Justinian'. Side elevations of pier A (left) and pier C (right).

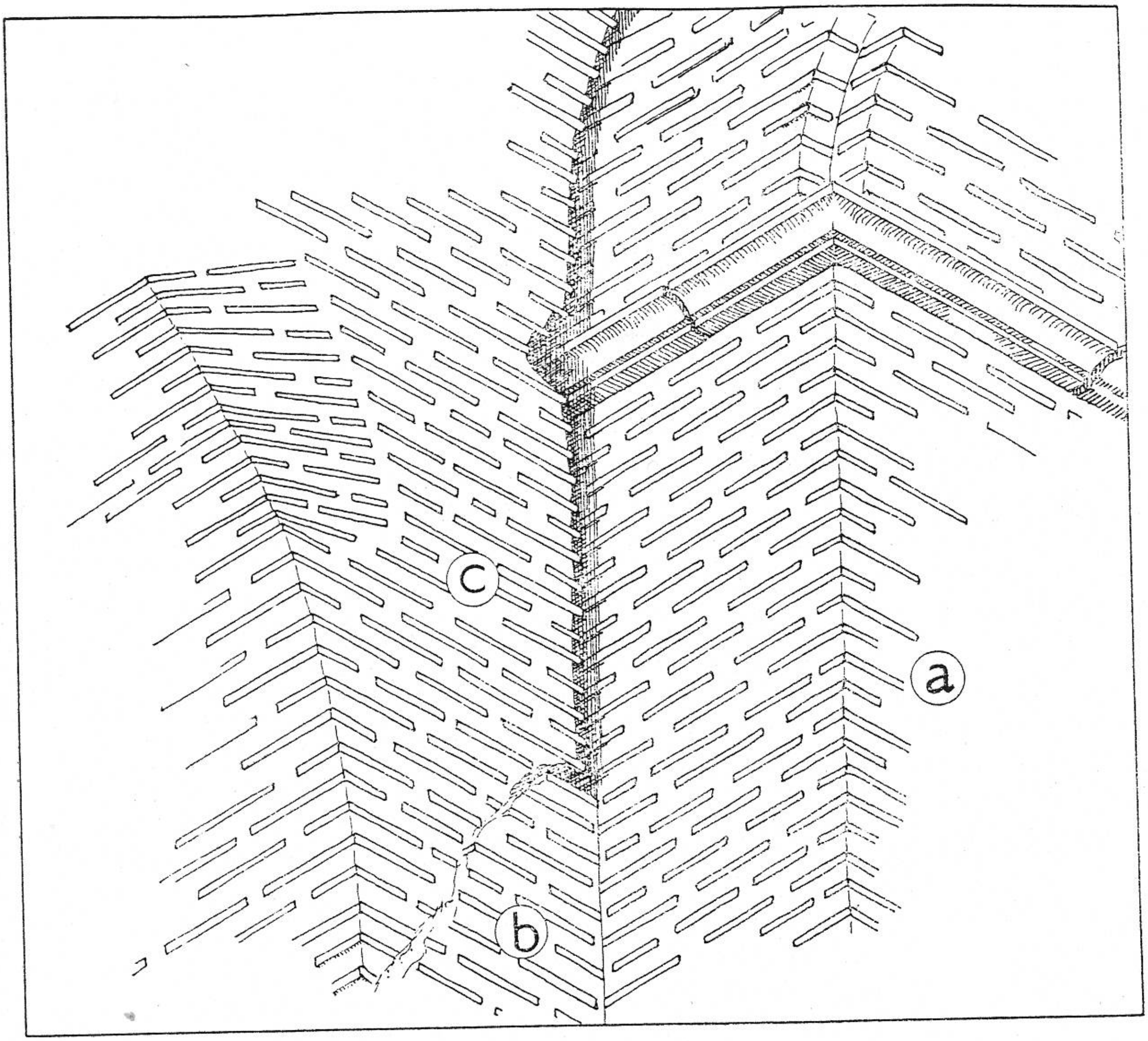


Fig. 38

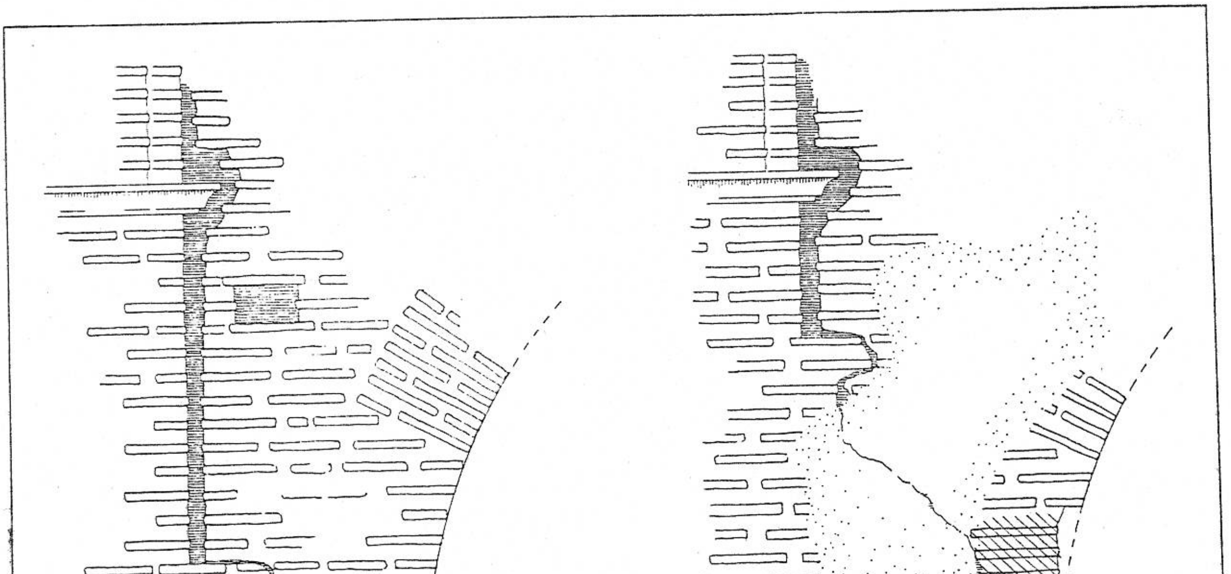
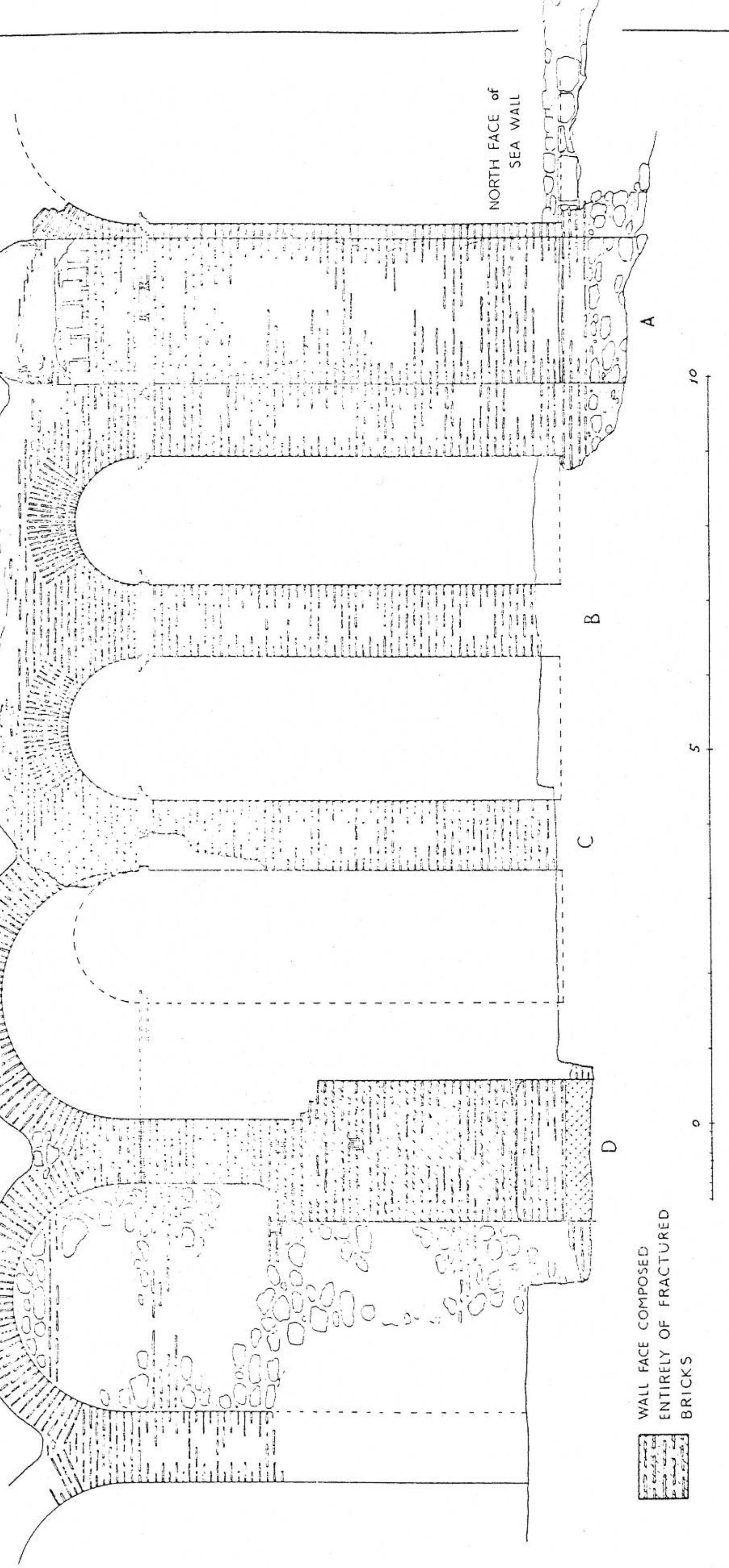

MODERN
100
50
0
1
2
METRES

Fig. 3

find that the bricks in the lower part, which were formerly bonded into the body of the pier, are in every case broken bricks and every brick-face on the north side of the remaining extension is artificially formed by the smoothing-off of a fracture (Fig. 40). Above the level of the original extension, where the pier was T-shaped, the bricks are all whole, showing that they belong to the secondary vaulting and were never bonded with the body of the pier.

The purpose of the southward extensions of the four piers is problematical, but a clue may lie in the fact that, in its original form, the extension of pier C (and presumably of B too) rises higher than those of A and D (Fig. 39). This suggests that the projections may once have supported some kind of sloping roof or pediment attached to the south face of the triple arch. Alternatively, though less probably, the projections may have been pedestals for some kind of sculptured ornament.

The whole of the foregoing description of the southward extension of the four piers and their subsequent use as supports for the secondary loggia vaulting is complicated by the fact that, although they were once bonded integrally with the main part of the piers, they are now separated from them by ragged fissures. In pier A the fissure is roughly vertical and coincident with the extension, and the fissure in pier D was probably the same, thus accounting for the fact that the extension survives while the pier has largely disappeared. In pier C the fissure took an irregular shape. In the upper part it projected further to the south than did the more or less vertical fissures of piers A and D, but lower down it ran deep into the northern part of the pier and reduced it to the dangerous condition which is visible in plate XXXIII of Mamboury's *Kaiserpaläste*. Pier B has been too much restored for the original shape of the fissure to be recognizable. The piers are fissured in this way for the obvious reason that the southward extensions stood on top of the original sea-wall and thus were very well underpinned while the rest of each pier had less solid foundations. In the course of time the ground underneath any heavy building is bound to sink slightly. Normally there would be an evenly distributed settlement and such a pier would sink a few centimetres into the ground without being seriously distorted; but undistorted settlement was prevented in this instance by the ancient walls which lie underneath. At the same time the arches and vaults on the north side of the piers made uneven settlement (i.e. a slight tilting of the piers) impossible, so the time came when the whole weight of each pier and its superimposed vaulting was pressing down on to the fifth-century wall through the southern arm of the pier alone. The shearing force which was thus set up resulted in each pier splitting more or less vertically into two pieces, thus allowing


NORTH FACE of SEA WALL
A
B
C
D
0
5
10
WALL FACE COMPOSED ENTIRELY OF FRACTURED BRICKS

the main part of the pier to settle down while the southern extension was left perched on top of the earlier wall.

As was noted above (p. 177), there is a thick layer of concrete belonging to the period of the second sea-wall between the top of the fifth-century wall and the base of the four piers A to D. This shows that the four piers were built at a later date than the second sea-wall, which we have tentatively assigned to the seventh century.

While the vaulting of the loggia roof is of later date than the piers (A to D) which support its north side, as is shown by the vertical joint in the upper part of these piers and by differences in the brickwork of the two periods, the corresponding piers on the south are contemporary with the vault itself. These piers (E to K) have no independent foundations but rest directly on the ashlar face of the second sea-wall and the concrete core which it encloses. The characteristics of the brickwork of these piers has already been noticed in comparing it with piers A to D.

A few marble fixing-pegs, irregularly spaced, suggest that there may once have been a sheathing of marble on the later piers as well as on the early ones, but the pegs are so infrequent and irregularly spaced that it is not possible to be sure of this in the upper levels. However, there was certainly marble facing near the floor, for a few fragments of it were found *in situ*. If there was no marble above, the loggia may quite well have been covered with plaster, either painted to imitate marble or frescoed. The floor of the loggia was paved with large slabs of stone or marble, as is attested by the remains of the mortar bedding which bears traces of the stone-jointing (Pl. 40, B). None of the actual paving was found. The mortar bedding is buff-coloured and much softer than the white brick-dust filled cement which is used in the brickwork and concrete of the other structures.

Of the six piers which remain on the south side of the loggia (E to K), all except the most easterly one (K) support the southern abutments of the row of parallel cross-arches upon which the vaulted roof rests. The cross-arches from piers E, F and G are supported at the opposite end on piers A, C and D respectively. Pier B had no cross-arch because the place opposite it is taken up by the widest of the openings in the loggia façade. The architect was obliged by the spacing of the earlier piers to put either two narrow arches between piers E and F, or one wide one, and he chose the latter alternative. The broad arch and the vault behind it were given an elliptical shape so as to keep the springing-levels and the roof-levels of the whole range of the loggia façade more or less horizontal.

Pier K differs from the other piers on the south side of the loggia in an important respect; it did not support a cross-arch. Unfortunately the north face of the pier has been cut back and rebuilt to such an extent that it is no longer possible to study the upper part, and modern houses make it impossible to excavate around its foundations; but in spite of these difficulties it is quite clear that it did not have a cross-arch like the other piers of the façade. The place in the upper part of the pier where the brick voussoirs of the cross-arch would be visible if they had ever existed is occupied by unbroken, horizontal brick-courses which are obviously part of the original structure. It is therefore certain that, if there was ever any arch at all on the north side of pier K, it was considerably narrower in span than the other arches which support the loggia vault. Pier K seems, therefore, to mark the eastern extremity of the loggia, and although there is no vertical joint in the south façade to distinguish the eastern boundary of the pier, the wall-face here has been so extensively refaced and repaired that it is possible that such a joint did exist formerly and that it has been obscured by later work.

The cross-arches which span the loggia are of brick, each consisting of 70 to 80 radial brick voussoirs with each voussoir made of one and a half bricks, bonded so that the half-brick comes alternately on the inside and on the outside of the archivolt. A segment about 80 cm. high at the base of each arch is built in horizontal courses which corbel gently out to fit the curve of the archway. Near the summit the arches intersect the curvature of the barrel vaults, and the fasciae of the archivolts are flared outwards to correspond with the cylindrical surfaces of the vaults.

The barrel vaults are so constructed that all the bricks lie parallel with the axis of the barrel and, as seen in cross-section, radiate from the centre of the curve. They do not, as is often the case in Byzantine vaulting, lie transversely across the curve of the vault; a technique which allows the builders to minimize the quantity of wooden formwork needed in the course of construction.[1] At the time when these vaults were built the spans in question were probably thought to be too large for the more economical timberless method.

The five openings between piers E and K were embellished with a miscellaneous collection of marble door-frames which are obviously culled from more ancient buildings (Folder D). The door-frame between piers E and F has vanished except for its sill, a very large monolith. The next doorway (F-G) is narrower. Its eastern jamb has vanished and is now replaced by a brick pillar, but the western one survives. It is a piece of a classical architrave with three fasciae ornamented with bead-and-reel and a cyma which, though badly weathered, still shows the high

[1] Auguste Choisy, *L'Art de bâtir chez les Byzantins*, Paris, 1883, chap. 3 (*passim*).

quality of its sculpture (Pl. 39, E). The central fascia of the three has been roughly chiselled away, possibly in order to efface an inscription. The lintel of the doorway is Byzantine work and reproduces the mutilated profile of the architrave but omits the decoration; i.e. it has only two fasciae and a blocked-out cyma of rectilinear profile. The hood of the doorway, lying above the architrave, is richly decorated with a series of well-formed classical motifs, skilfully carved but arranged in a somewhat unorthodox sequence (Fig. 41; Pl. 41, B). The block of marble from which the door-sill is made was formerly another cornice; it is enriched with well-carved mouldings of classical form.

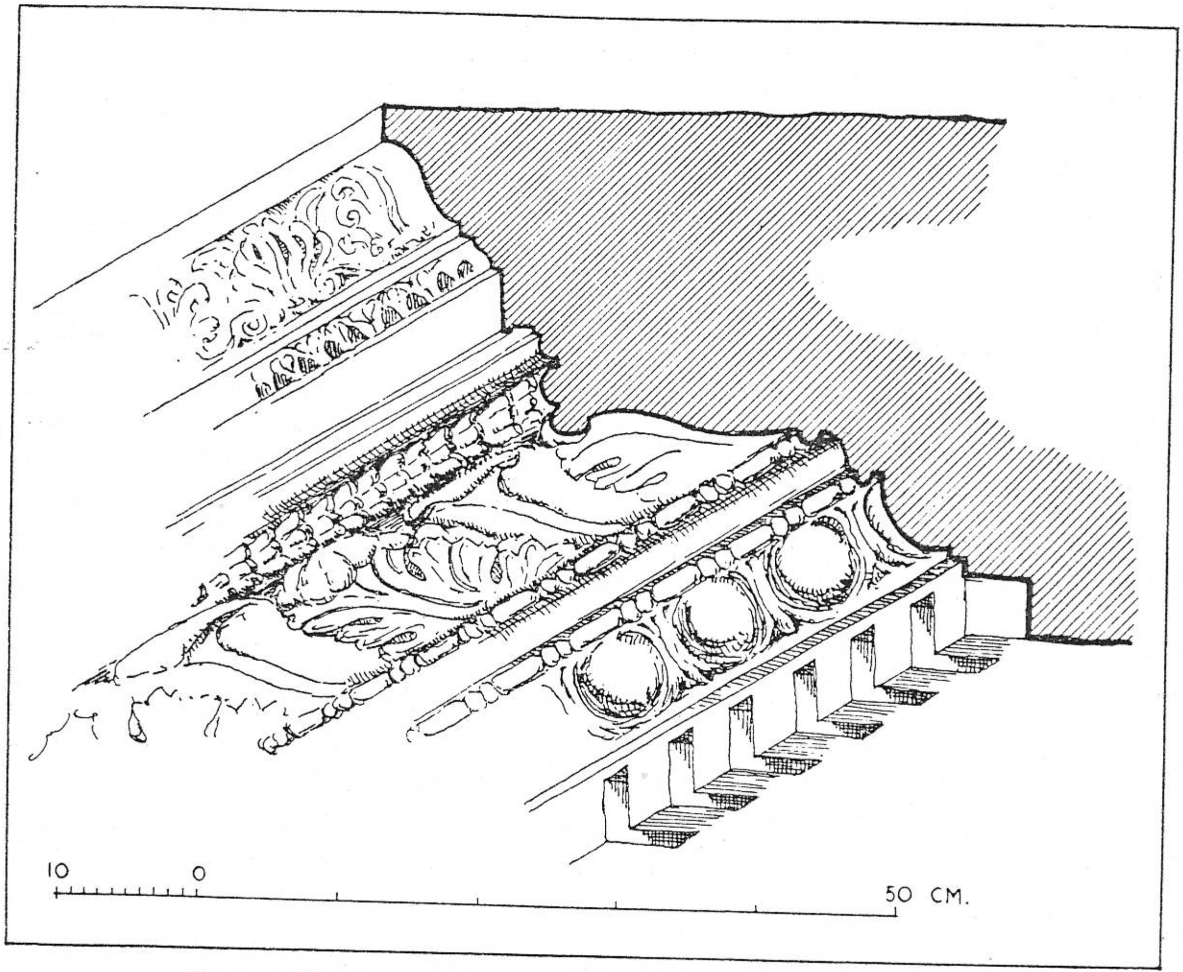


FIG. 41. 'House of Justinian'; hood above doorway F-G (see also Pl. 41, B).

The next door-frame, between piers G and H, is Byzantine work and complete. Jambs and lintel are of the same cross-section and the lintel lies squarely across the tops of the jambs except at the front, where the angles are mitred. Both interior and exterior faces of the stones are decorated with architrave mouldings (Fig. 42), the interior having two plain fasciae and a large cyma-recta, while on the exterior there is a more elaborate moulding consisting of cavetto, torus and cyma. Originally the cavetto was smaller and was flanked by fillets, but the inner moulding has been removed at some time, leaving a marked roughness in the central part of the cavetto. The door-frame is surmounted by a simple hood mould of two cymae-rectae with plain fillets, and in the centre of the upper cyma there is a simple cross in relief. Five sockets cut in the lintel were presumably for the fixing of curtain-hooks.

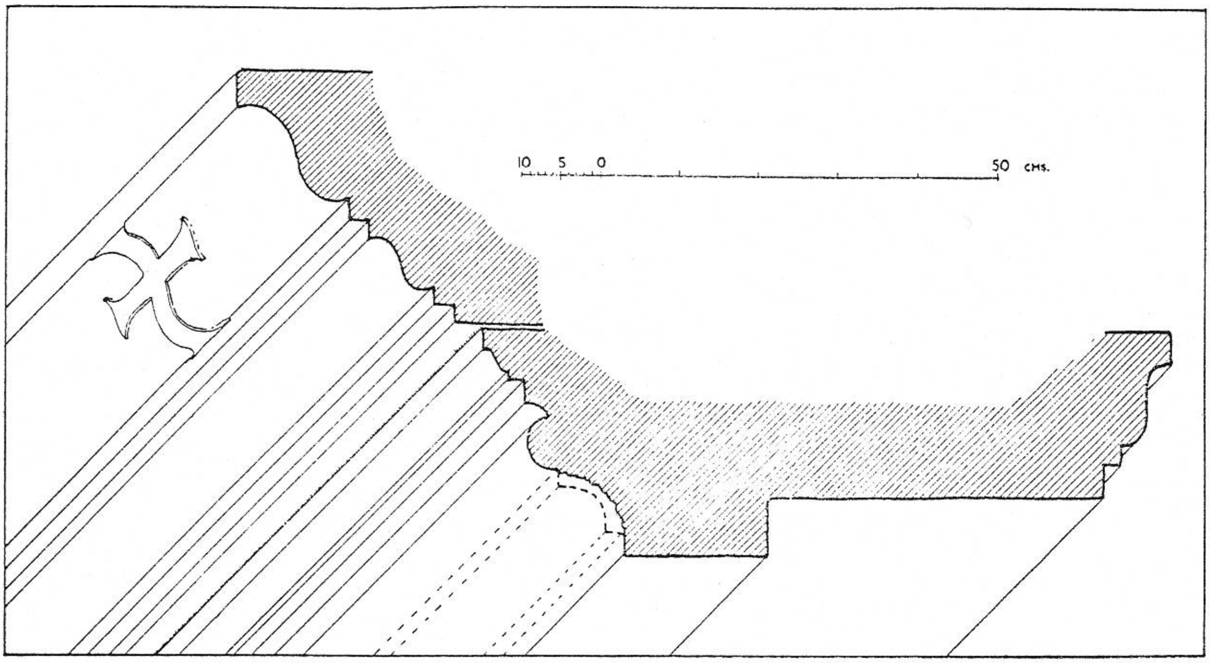


FIG. 42. 'House of Justinian'; lintel and hood of doorway G-H.

The third door, between piers H and J, is nearly the same width as the second one but considerably taller. Like its neighbour, jambs and lintel are of the same cross-section, and here too the lintel is mitred in front but is set squarely upon the horizontal end-surfaces of the jambs for the greater part of its thickness. The mouldings are simpler than those of the former door, having only a plain cyma on the interior (now almost entirely destroyed) and a cavetto and torus on the outside (Fig. 43). The hood is like that of the second door, having two cymae and a simple cross in relief. The stone of the hood has on its reverse side another moulding consisting of a three-quarter round torus, two fasciae and a cyma, but as this moulding must have been concealed it survives apparently from some former use of the stone.

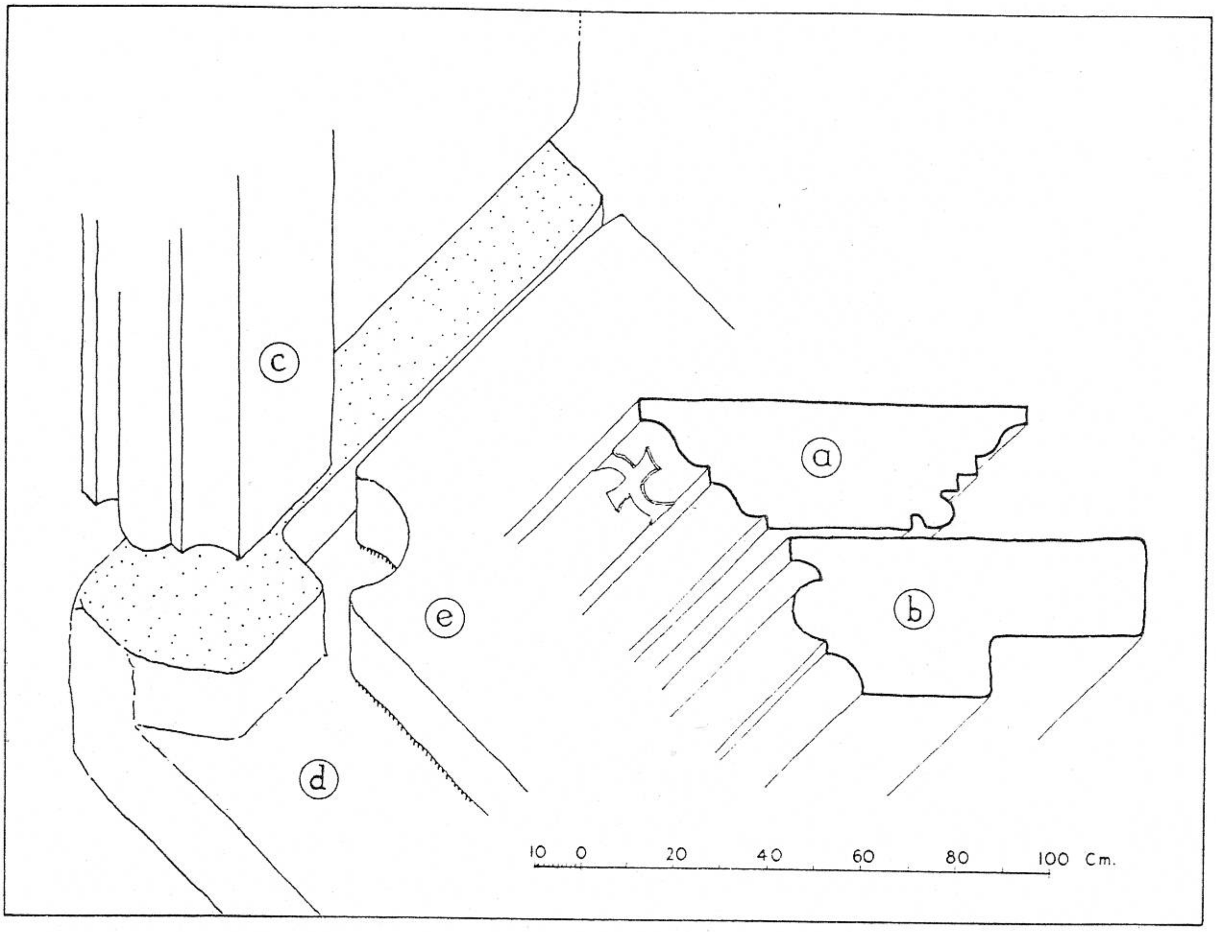


FIG. 43. 'House of Justinian'; door H-J.
(*a*) Hood; (*b*) Lintel; (*c*) Jamb; (*d*) Lower part of sill; (*e*) Upper part of sill.

The sill of this door consists of two horizontal slabs cemented together. The lower one supports the ends of the two jamb-stones while the upper one merely fits in between the jambs to make a raised threshold and sockets for the door-hinges. It is an economical but rather inferior way of making a rebated threshold.

There was formerly a doorway in the opening between piers J and K, but only the sill remains.

All these doorways opened on to a narrow balcony which was supported over the harbour upon a row of marble brackets, some of which remain in place although the balcony itself has entirely gone. Each bracket consisted of two stones cantilevered out from the ashlar wall; some are rectangular in cross-section and terminate in a large cyma moulding (Folder E) while others are made of column-shafts laid horizontally. In either case the brackets are morticed into sockets which are cut for the purpose in the ashlar of the seventh-century sea-wall. In the places where the brackets have fallen out their mortice holes can still be seen. The brackets were spaced evenly, about 1·9 m. apart. The floor and the balustrade of the balcony were probably of marble too, but nothing of them remains.

As pier K seems to mark the eastern extremity of the loggia, the walls beyond it probably belong to separate apartments. A study of the façade confirms this view, for the whole character of the building changes. In the first place there was no balcony to the east of pier K; the marble brackets cease and the unbroken face of the ashlar sea-wall shows that there can never have been any. Secondly we notice on the plan that there is a slight alteration in the alignment of the wall. The face of the sea-wall continues in a straight line, but whereas the south wall of the loggia is exactly parallel with it, the wall to the east of K turns slightly towards the north.

The type of masonry also changes. In the loggia walls everything is of brick (except for later repair work), but to the east of pier K the brickwork is interspersed with horizontal bands of squared stones. There is, in general, a change in the quality of the building. Whereas the loggia to the west of K consists of members of irregular size, embellished with a haphazard collection of second-hand doorframes; on the east side of pier K we find a neatly planned façade consisting of three small arches supported on a pair of marble columns which have excellently carved matching capitals.[1] Above the three arches there are three small windows. The arches have rebated fasciae similar to those in the arches on piers A to D (a feature which is absent from the arches of the loggia) and at the springing of the arches we find thin marble cornices which have exactly the same dimensions, mouldings and texture as the cornices on piers A to D.

The triple arch to the east of pier K is thus seen to belong to a different period from the loggia, and the fact that its rebated archivolts and moulded cornices are exactly matched in the triple arch between piers A and D makes it seem very probable, if not certain, that the two buildings are contemporary. Mamboury records the former existence of yet another triple arch, apparently matching the one on the east side of pier K, at the opposite extremity of the façade; i.e. close to the point where the monumental stairway meets the ashlar face of the second sea-wall. These three triple arches are more or less evenly spaced out; the large one A-D set back in the middle and the other two flanking it, but set forward at the edge of the sea-wall terrace. It seems fairly reasonable to assume that the area upon which the loggia was subsequently built, between the three sets of triple arches, was originally an open terrace. Now we have already seen that the irregular spacing of the loggia piers E, F and G is due to the fact that they have to correspond with the emplacement of the pre-existing piers A, C and D and it therefore seems not unlikely that the location of the loggia piers H and J will provide a clue to the location of two more piers in the earlier building. On this basis we are able to fill in the two piers in the north-east quarter of the terrace, to the east of pier D, as shown in Fig. 44.

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[1] Rudolf Kautzsch states that these capitals are certainly Justinianic; *Kapitellstudien*, Berlin, 1936, p. 175.

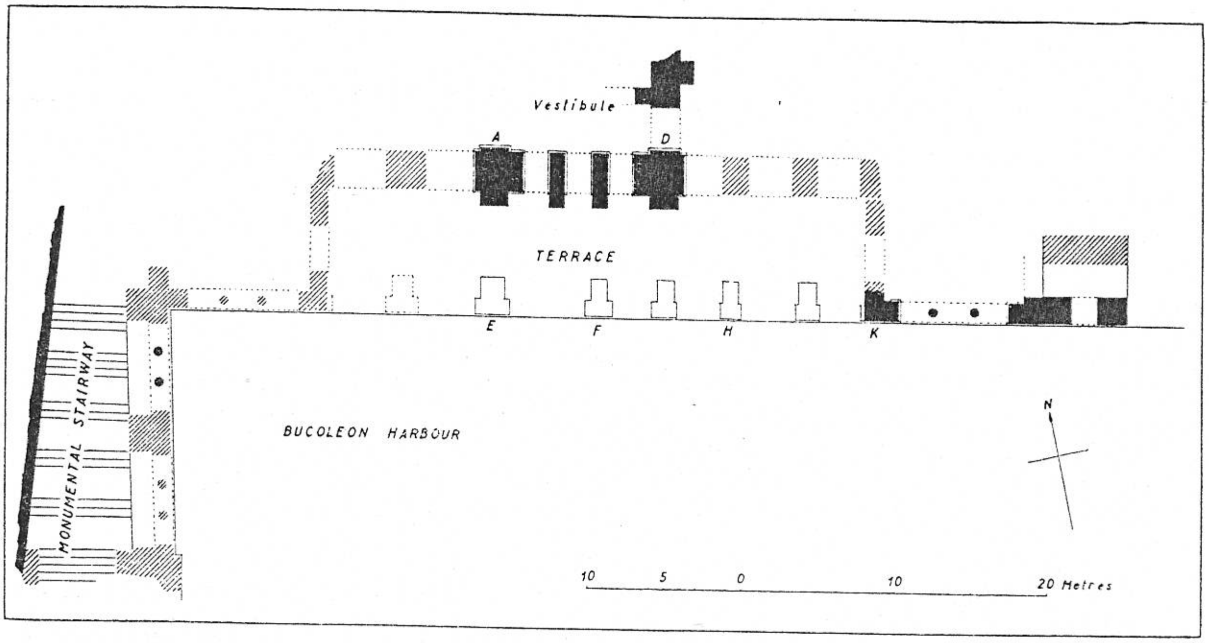

FIG. 44. 'House of Justinian'; conjectural plan of the original terrace.

At the opposite end of the façade, on the west side of pier A, there are two separate factors to indicate the position of yet another pier in the Palace wall. Firstly, enough remains of the arch which formerly sprang from the west face of pier A (Fig. 40) to show that it had a span of about 3 m. or a little more. Secondly, we can deduce the existence of a loggia pier at the front of the terrace some 3·2 m. to the west of pier E from the photograph taken in 1880 which Mamboury reproduces as plate XXIX of *Kaiserpaläste*. Although the pier itself is scarcely recognizable on the photograph, the door-sills on either side of it can be seen and fairly exactly located with reference to the balcony brackets underneath, which still exist. The coincidence of these two factors leaves no doubt that there was once a pier 3·2 m. to the west of pier A, as shown in Fig. 44.

It seems very likely that the monumental stairway belongs to the same group of buildings. According to Mamboury's interpretation of the remains, the triple-arch motif again appears in the wall on the east side of the stairs; and the brick-and-stone banded masonry which we noticed in the eastern triple-arch wall again appears in the stairway wall.

C. CONCLUSIONS

Our information about the topography of the Great Palace at the place where it overlooked the harbour may now be summarized. In the first phase of which anything remains to be seen to-day there was a city-wall, 'dog-leg' in plan, bounding the sea. The top of the wall was crenellated, and below the top platform there was an internal passage giving access to a row of narrow windows which opened through both sides of the wall. The upper part of the wall was built of small-scale, but neatly squared and coursed stonework, with arches and horizontal reinforcing courses of brick. The lower part of the wall was built of heavy ashlar stonework, probably a precaution against the destructive power of the sea. Two small gateways passed through this wall at the lower level.

In the second stage, the early wall was completely masked by the addition on the seaward side of a massive ashlar-faced concrete bastion which more than doubled the thickness of the sea-wall. The concrete filled the internal passage of the first wall and the crenellations were also buried in it. Of the two original gateways, the western one continued in use, an opening being left in the concrete addition, but the eastern one was blocked up and buried in the concrete.

The third stage was the addition of a number of buildings above. A grand staircase was constructed in the re-entrant angle of the sea-wall, leading up from the Bucoleon Harbour, which lay at the foot of the wall, to the terrace above, upon which the palace was built. The top of the sea-wall, where it overlooked the harbour, was laid out in a formal manner as a rectangular terrace with triple-arched pavilions at each end. At the rear of this terrace there was a vestibule with a portico of three arches giving access, presumably, to the inner part of the palace.

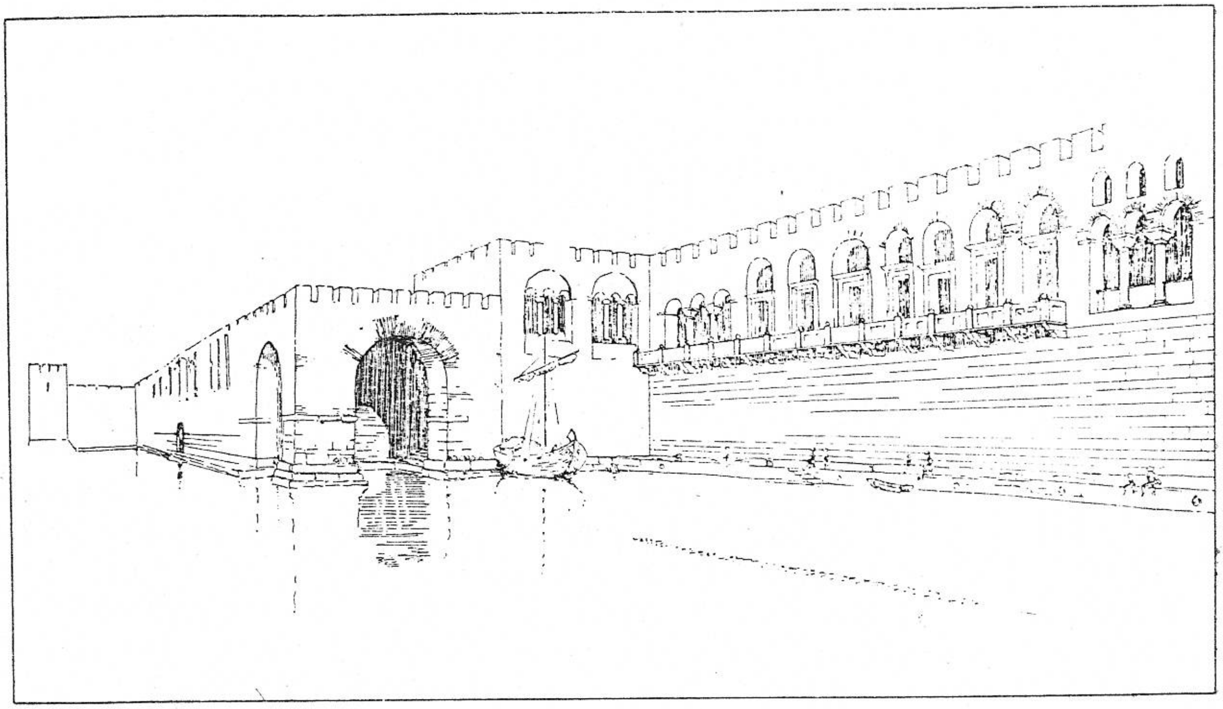

FIG. 45. The Bucoleon Harbour and the terrace overhanging it, after the building of the Loggia.

Finally the rectangular terrace was roofed over with brick vaults, supported on one side by the portico of the previous period and on the other by a new arcaded façade. The vaults which are visible to-day belong to this final period. The open terrace which thus became a vaulted loggia was replaced by an overhanging balcony, added to the second-period sea-wall. A suggestion of the appearance of the Palace in this final stage is given in Fig. 45.

The dating of these four phases of construction is still very uncertain. The first stage seems likely to represent the city-wall which was built in the fourth or fifth century. The style of masonry resembles that of the Theodosian land-walls, but it must not be forgotten that this type of wall-building continued more or less unchanged from the fifth to the eighth century.[1] Nevertheless, as we have no evidence of earlier fortifications on the site, the first wall may be provisionally assigned to the earliest period of fortification after Constantine's foundation of the new city; i.e. some time before the completion of the city defences in the reign of Theodosius II.

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[1] B. Meyer-Plath, *Die Landmauer von Konstantinopel*, ii p. 24.

The presence of re-used stones from an important Justinianic building suggests that the second stage is not earlier than the beginning of the seventh century.

In the third stage the solid and regular character of the brickwork of piers A to D suggests a date not too far removed from the Justinianic period. In the present state of our knowledge it is premature to suggest anything more definite.

The date of the last phase, the building of the vaulted loggia and the marble balcony, is even more uncertain. Nevertheless, it may be noted that the quality of the brickwork is still quite regular and solid and is therefore likely to be somewhat earlier than the rubbly and uneven masonry of the sea-wall towers in the vicinity of the Seraglio Point, which are dated by inscription to the reign of Theophilus (829-842).[1] The loggia is therefore assigned, provisionally, to the eighth century. One thing is certain; the buildings are most definitely not to be associated with the palaces of Hormizdas or Theodosius II, as was at one time supposed, though the suggestion has already been discarded by Ebersolt and, more recently, by Guilland.[2]

G. U. S. C.

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[1] R. Janin, *Constantinople Byzantine*, p. 277.

[2] J. Ebersolt, *Constantinople Byzantine et les Voyageurs du Levant*, Paris, 1918, p. 254; R. Guilland, in *Byzantinoslavica*, xi, pp. 65 ff.

APPENDIX

REVIEW OF THE FIRST REPORT

By A. M. Schneider*

This publication is concerned with the results of the excavations undertaken by the Walker Trust in Constantinople between 1935 and 1938. It is published all too modestly under the heading 'report'; it is in fact an important contribution to research.

Hitherto only literary sources have been available for the study of the topography of the Imperial Palace,[1] for the valuable plans published by Mamboury and Wiegand[2] did not contribute very much to our knowledge of the topography of the region; they indicated rather where excavations might be conducted with hope of success. The Walker Trust publication, on the other hand, is concerned with the results of actual excavation, and these are of particular interest because of the wide influence that was exercised by the Palace on architecture elsewhere. Ravenna, Aachen and Aboba Pliska may be mentioned in this connection.[3]

The Preface deals with the progress of the work and gives the names of those responsible for it under Professor Baxter. There follow a chapter on archaeology by G. Martiny, one on the pottery by R. B. K. Stevenson, and lastly a thorough description of the mosaics by G. Brett. The originals of the colour plates are by W. J. Macaulay.

About 50 m. on the sea side of the south-east wall of Sultan Ahmed and not quite parallel with it run two lanes, the Araste Sokak and the Torun Sokak, which both meet the Tavuk Hane Sokak at a right angle. The area excavated comprises the region in which these three roads meet, inland of the group of substructures Db and Dc on the plan of Mamboury.[4] The area is not only covered with the ruins of older structures, but also with modern buildings. Excavation was therefore very difficult, quite apart from the fact that a very considerable amount of earth had to be moved. In spite of this the excavations succeeded in completely uncovering a large part of the building. It proved to be a Peristyle court measuring 55·5 by 66·5 m., with a mosaic pavement within a colonnade around it. The pavement was some 10 m. wide on the north-east and south-east sides and 11 m. wide on the north-west side. The spaces between the columns measured 3·94 m. The outside wall on the north-east side had at regular intervals seven pilasters with niches between them, in which were apparently marble seats. The pilasters were of brick and were not bound in with the wall, which was of rubble. The same arrangement appears to have been adopted on the south-east wall, which was only excavated in two places. The text, however, does not deal with this point; I assume it from the nature of the section in pl. 63, I—I, though it is not shown on the plan.[5]

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* This review was originally written for *Antiquity*, but was never published. It is reprinted here because it constitutes a valuable contribution to the study of the archaeology of the region by one who was a leading authority. Dr. Schneider's death in 1955 was one of the most serious losses to Byzantine archaeology of recent times.

[1] I refer here only to the publications of Labarte, Paspates, Beljajew, von Reber, Ebersolt and Vogt.

[2] Mamboury-Wiegand. *Die Kaiserpaläste zu Konstantinopel zwischen Hippodrom und Marmarameer*, Berlin, 1934.

[3] See Welkov's article in *Antiquity*, xiii, 1939, p. 293.

[4] See the general plan in Schneider, *Byzanz*, Berlin, 19, pl. 10.

[5] This area was excavated in 1953, but the walls were so destroyed that further conclusions on this point are impossible.

At a later date the building was reconstructed. The columns were done away with, and the north-east and south-west colonnades were replaced by walls, pierced by door and perhaps also by window openings. The open court, originally planted with grass, was provided with a marble pavement, and the mosaics of the colonnades were also covered with a marble floor. This helped considerably in preserving the mosaics. Right across the court, but entirely covered by it, ran an older street, 5 m. wide. Prolonged to the north-west this would have met the Hippodrome at a right angle. To take the place of this, when it was covered by the Peristyle, a second street, also 5 m. wide, was laid along the outside of the north-east wall. A corridor 4 m. wide was found outside the north-west wall, and there was a door leading from here into the Peristyle hall at the northern end. It is not possible to state if there were more doors, as the outer walls were excavated only at the north-east and north-west sides over any considerable length. In one place (D) the foundation of the north-east wall was investigated in detail, and virgin soil was reached at a depth of 8 m. The foundation consists of rubble walling on a framework of timber. In front of the foundation wall remains of a late Roman wall were found, associated with which were fragments of shallow plates of terra sigillata of late type, with crosses stamped upon them (pl. 27, 9). The filling above this contained sherds of Hellenistic and Roman types. On the assumption that terra sigillata bearing crosses was not in use before the fifth century, Martiny concludes that the building should be dated to about 410 (pp. 17 and 31). This date is supported by the nature of the ornament of the only capital found in the debris (pl. 9, 1 and 13, nr. 413). The reconstruction, on the other hand, is assigned to the time of Justinian, on the basis of the mouldings of the door-jambs that were used (p. 16).

Further excavations towards the north-east, between the Araste and the Torun Sokak, produced a complex of walls. These were unidentifiable close to the Peristyle (B, 2), but further on a corridor some 20 m. long was reached, which, with adjoining chambers, was identified as the substructure of a church. The corridor was 1·2 m. wide, and its north-western side was bounded by massive pillars from which sprang five arches, though only the bases survived. Brick stamps indicated that this structure should be dated to the sixth century. Martiny thinks that its south-eastern wall was partly pulled down in Isaurian times, and replaced by a wall in order to widen it. In Comnenian times it was again altered, being cut off on the south west by a cross-wall. The remaining portion was adopted as a burial-place, and seven layers of corpses were found, one on top of the other, separated only by thin layers of earth. A pilaster on the south-eastern wall bore incised crosses and other symbols, and in the middle of the wall was a semicircular niche in which a lamp had been suspended (pl. 12, 2). This room was roofed with a timber ceiling, in which there had probably been an opening for the introduction of the corpses. Two fragments of inscription were found near by (pl. 12, 5). They would appear to be funeral epitaphs. In the rubble north-west of the great pillars were found small bits of copper with round holes punched in them. They are regarded by the excavators, probably correctly, as waste from the imperial mint, which was set up, according to Mesarites, in the vaults of the Imperial Palace.[1]

These finds are valuable in themselves; their value would be greatly increased if the part of the Great Palace in which they were made could be identified. There are, however, considerable difficulties with regard to the topographical identifications of the buildings. In the Book of Ceremonies the Chrysotriklinos, the Heliakon of the Pharos, and the churches of St. Elias and St. Demetrios are mentioned as a single group, and Martiny suggests that the Peristyle court and the substructures Db and Dc of Mamboury-Wiegand are to be identified as the Heliakon of the Pharos, the Church of St. Demetrios and the Church of St. Elias respectively; the church of the Pharos would have stood between the two. Martiny further took the two large barrel vaults adjoining Dc as the foundations of the Pharos.

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[1] Nicholas Mesarites, *Die Palastrevolution des Johannes Komnenos*, Herausgegeben van A. Heisenberg, *Program des Gymnasiums Wurzburg*, 1907, p. 25.

Tempting as this identification is, it cannot, in my opinion, be maintained. We know, to begin with, that there was a continuous watch kept up on the Heliakon to observe light signals from Mons S. Auxentii (Kayish Dagh).[1] If the south-east side of the Heliakon was hidden by the Pharos, and the churches of St. Demetrios, St. Elias and the Theotokos of the Pharos, it would have been impossible to see in that direction.[2] In addition, the substructure Dc would have to belong to the round church of St. Elias, built by Basil I.[3] Dc is, however, neither round, nor does it belong to the ninth century, for the masonry is either very late Byzantine or early Turkish. Neither can I accept the identification of the adjoining vaults as substructures for the Pharos, for their form is not consistent with that of such a structure. Again, there is actually no statement that the Pharos was situated between the church of the Pharos and St. Elias. According to the Book of Ceremonies, their Majesties proceeded through the Makron of the Imperial rooms directly into the Pharos church, and from there went without delay into the church of St. Elias, where a prayer was said. Then they left St. Elias and went from the Pharos church to the Heliakon, and from there to the Nea. The Emperors could therefore walk directly from the Makron into the church of the Pharos without entering the Heliakon, just as they could walk from the church of the Pharos to that of St. Elias.[4] This would have been impossible had the Pharos been situated between them. And in any case one would expect to find the Pharos nearer the sea. Mesarites mentions the Lutrion of the Pharos church, and states that from there one saw the lighthouse.[5] It is thus possible that the Pharos was at quite a distance from the Heliakon.

The ruins to the north-east (B, 2) are interpreted as the Aetos and the church of St. Mary of the Aetos. But the name suggests that the Aetos was situated on high ground. Also it was not built by the Emperor, Marcian, as is stated on p. 28, but by Basil I.[6] Moreover, it does not seem to me certain that the remains are those of a church. The plans and section do not help much, and it is not possible to gather from them any idea of the Isaurian reconstruction, which does not appear in the section. Further, if this really is the Aetos, the reconstruction cannot be Isaurian, because the Aetos was not built until later. It may be questioned, however, whether the reconstruction is Isaurian at all. The niche in the wall with herring-bone ornament (pl. 12, 2) suggests a much later date, namely the fourteenth century. Niches with similar decoration appear on the outside of the south wall of Fenari Isa Cami (Lips Monastery) and at the southern end of Fetiyeh Cami (St. Mary Pammakaristos), which was built by Michael Glabas before 1315. The burials also do not necessarily indicate that the building was a church, for we know that Apocaucos held people as prisoners in 1345 in the substructures of the Justinianos, which had collapsed after 1289.[7] People might well have been similarly imprisoned elsewhere and been buried close to where they were imprisoned. The wall with the niche and the incised crosses would seem rather to deputise for than to belong to a church.

The vital question that concerns us is that of the identification of the area. Martiny regards the massive pillars to the north-west of the corridor as Justinianic. But as far as we know Justinian did not build anything in this region. The Chrysotriklinos was the work of his successor Justin II, and it is concievable that we may be in the region of that building.[1] If so, the question of the identification of the Peristyle remains open.

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[1] Theophanes Continuatus, Bonn, 197.

[2] Labarte and Ebersolt have made their reconstruction accordingly. There is an unobstructed view from the Heliakon towards the East.

[3] Heisenberg, *Mesarites*, p. 38.

[4] Ebersolt, *Le Grand Palais de Constantinople*, Paris, 1910, p. 136.

[5] Heisenberg, *loc. cit.*, p. 33, 9.

[6] Theophanes Continuatus, *Basilius vita*, 90.

[7] Cantacuzenos, Bonn, 2, 537.

Curiously enough, Martiny does not raise the question of what purpose the Peristyle served, unless he considers it an annexe to the Pharos. If the Peristyle did not belong to the Pharos, it certainly could not have stood alone, but must have formed part of some larger complex, perhaps a small palace. Now the Great Palace of Constantinople did not extend so far in early times, for construction only began there under Justin II and his successors. Justinian II built the Lausiakos and the Justinianos; Constantine V (741-75) built the church of the Pharos, Basil I (876-86) the church of St. Elias, and Leo VI (886-912) that of St. Demetrius. We must therefore find another explanation. Now in the Notitia Urbis (Seeck, 230) it is stated that there existed a number of private palaces belonging to members of the Theodosian dynasty; such were the Palatium Placidianum, the Domus Placidiae Augustae and the Domus Nobilissimae Marinae.[2] According to Synesius, who was in Constantinople about 400, the Domus Placidiae was situated behind the Imperial Palace.[3] Is it not possible that the Peristyle court belonged to one of these private palaces? If that were so, it would be necessary to date the Peristyle in the last decade of the fourth century. This would not be impossible, for Martiny's dating is based mainly on the late terra sigillata fragments with crosses stamped on them. The ware must be dated to around 400 on the basis of Waage's conclusions.[4] But Waage here follows Sulzberger's assertion that cross symbols were not in general use before the fifth century.[5] It is, however, clear from a sermon preached by Chrysostomos in 387 that crosses were used in his time on walls, ceilings, gables and similar places, as well as on books, beds, clothes, weapons and pottery.[6] There thus seems to be no difficulty in dating the terra sigillata earlier than Waage suggests. Moreover, cross symbols like those on the pottery fragments occur in association with inscriptions which are dated to the late fourth century.

It is thus just as possible that the Peristyle was built around 380 as around 410. Similarly, the date of the rebuilding of the Peristyle can hardly be regarded as firmly fixed. Martiny dates this reconstruction to the time of Justinian on the basis of the architectural mouldings. But though they are of Justinianic type, that does not necessarily imply that the building in which they were found must also have been of that period, for they might well have been reused at a later date. Indeed, on the basis of the pottery found on site A4, I would prefer to date the reconstruction to Isaurian times. Obviously many problems remain unsolved, but further elucidation may be forthcoming when the excavations are resumed.

The next section of the volume deals with the pottery. Those who have excavated Byzantine sites know the problems which the pottery present. Up to now the types have been more or less known, but it has not been possible to establish any exact chronology. Stevenson's survey establishes an entirely new basis. Various deposits firmly dated by coins were found, and on the basis of these, six stages were established, extending from early Isaurian to late Comnene times. The pottery is described in detail, the profiles are illustrated by drawings, and, even more important, the most important pieces are reproduced in colour. From what I know of this pottery, the colour reproductions are extremely good. Curiously enough, certain well-known types are missing, notably the early sgraffito wares and the ware akin to Persian 'Guebri', but this is to be attributed to the special character of the site. The specimens on pl. 24, nos. 1 and 2, would seem to have been influenced from Turkestan.[1]

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[1] The waste metal from the mint found there seems to indicate that the mint should be looked for not far from there. Admittedly we do not know its exact location. According to Nicetas Acominastes (453 Bonn) it was situated in the neighbourhood of the Skylai, which would put it further to the west.

[2] Even private houses seem to have been built in this area. A law of 409, Cod. Theod., XV, 1.47, prohibited the building of further houses.

[3] Migne, *Pat. Gr.* 66.1405. See also Assunta Nagl, *Galla Placidia; Studien zur Geschichte und Kultur des Altertums*, ii, 3, 1908, pp. 65 ff.

[4] *Hesperia*, 2, 1933, p. 303.

[5] *Byzantion*, 2, 1926, p. 426.

[6] 'Contra Judaeos et Gentiles, quod Christus Deus sit.' Migne, *Patr. Graec.*, 48, p. 826.

The last section of the book, by Gerard Brett, is concerned with the magnificent mosaic floor, which is discussed in detail. Good plates in colour supplement those in collotype. At first glance it would be tempting to assign the mosaics to the early fourth century on the grounds of their superior quality, but such a date is impossible on archaeological grounds. Brett proposes a date around 410 on the basis of details such as costume, and also because of stylistic factors. The best-preserved section is that on the north-east side; other portions were found on the north-west and south-west. The mosaic is bordered by a scroll of fat acanthus leaves; the figures of the main area are set against a white background, laid in a shell pattern. Overlapping has been almost entirely avoided; the scenes are in four zones one above the other, and the figures are arranged horizontally; only on one occasion was an attempt made to suggest depth, and only on a few occasions were strips of ground included below the figures. The distribution of figures, rocks, trees and so forth did not follow any definite plan. The figures include fabulous monsters, such as the unicorn, the chimaera and the lion-griffin; mythological personages, such as a nymph and a satyr with the young Bacchus on his shoulders; genre scenes, such as a fisherman by a pool, shepherds with their flocks, horses grazing, bears, a singer, a woman with her child, children trundling hoops round two metae, and a monkey catching birds; hunting scenes, including a tiger hunt and a hare hunt, a panther killing a stag, and a stag and an eagle fighting with snakes. The plastic treatment of the nudes and the lively expressions of the figures are especially noteworthy. The animals, especially the horses, are sometimes rather badly proportioned, and they are at times definitely stylized. Yet even so they show surprising vigour and vitality; the magnificent head of a tiger on pl. 55 is especially striking. The technical execution and the graduation of tones are both of very high quality seldom found in floor mosaics at this period. But the craftsmen no doubt came from the imperial workshops. Brett distinguished nine distinct groups of work, and this is not surprising when one takes into account the area covered, which extended to some 2000 square metres.

Brett bases his dating on archaeological evidence and on the nature of the costumes, the weapons and the style of hair-dressing. The fashion of arranging the hair so as to leave the ears uncovered came into vogue, says Brett, about the turn of the century. This is true, generally speaking, but the fashion was in occasional use in the second half of the fourth century.[2]

The other finds included nine face-masks of unusual form, and a frescoe, probably of the tenth or eleventh century. It is suggested that the masks might have been used in the ludi Gothici, which are mentioned in the Book of Ceremonies.

One may end by hoping that many equally exemplary publications may in the future be produced in this field of archaeological research.

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[1] Cf. F. W. Deichmann, Berliner Museen, *Berichte aus den Preuss. Kunstsammlungen*, 59, 1938, p. 65.

[Any resemblances to the pottery of Turkestan are likely to be fortuitous, for these two vessels are in reality variants of an important group, which I have termed 'polychrome ware'.—D. T. R.]

[2] See, for example, the statuette of Christ in the Museo Nazionale at Rome, *Roemische Mitteilungen*, 44, 1929, pl. 56, or Christ between the executioners on the sarcophagus of Junius Bassus.

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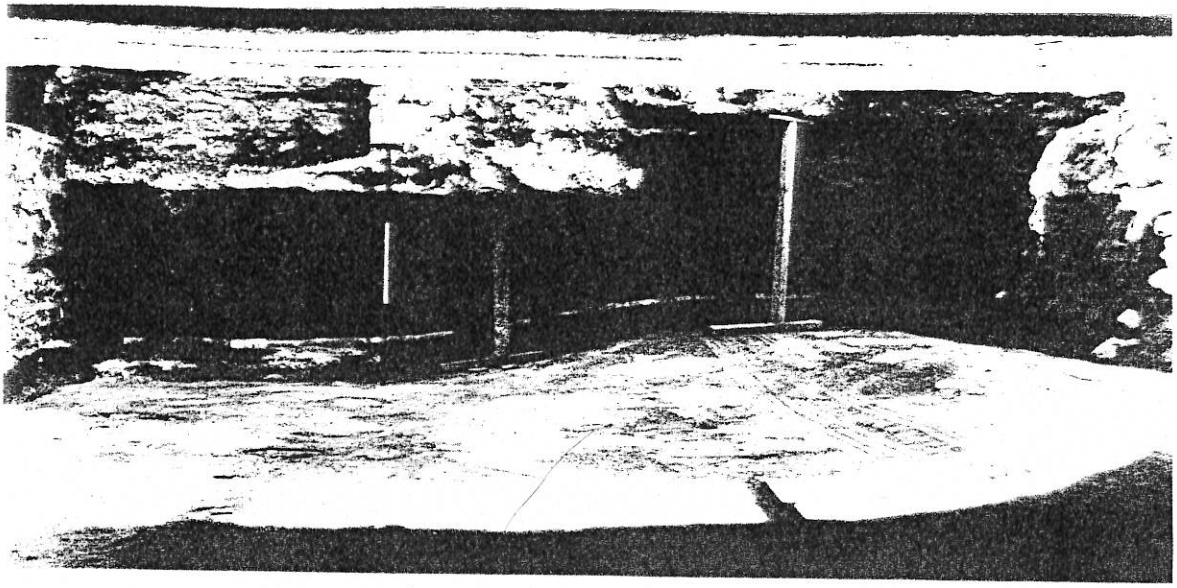

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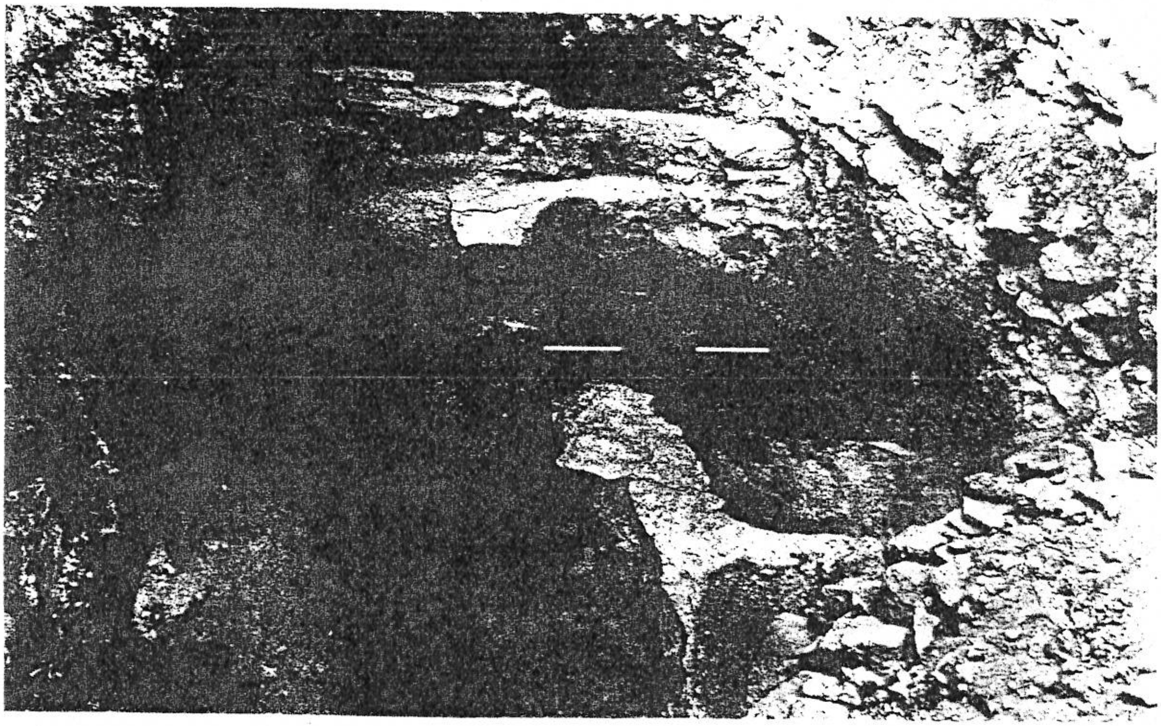

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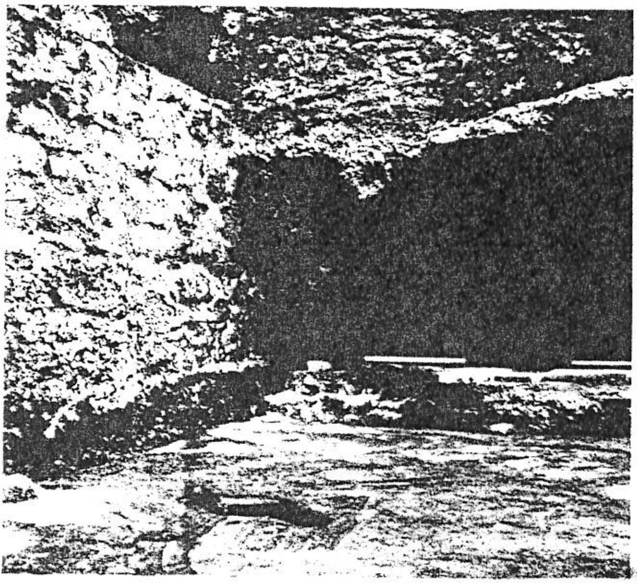
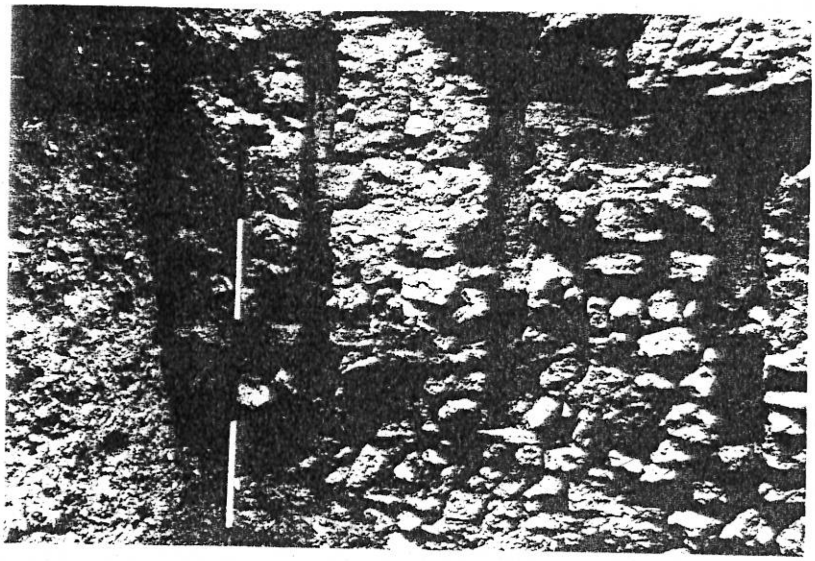


A, C. EXCAVATIONS BELOW TORUN SOKAK (Fig. 3)

A. Mosaic floor, with later marble floor above it.

C. Later inner wall, cut through marble mosaic floors.

B. CONDUIT UNDER FLOOR OF N.W. PORTICO, NEAR (Fig. 7).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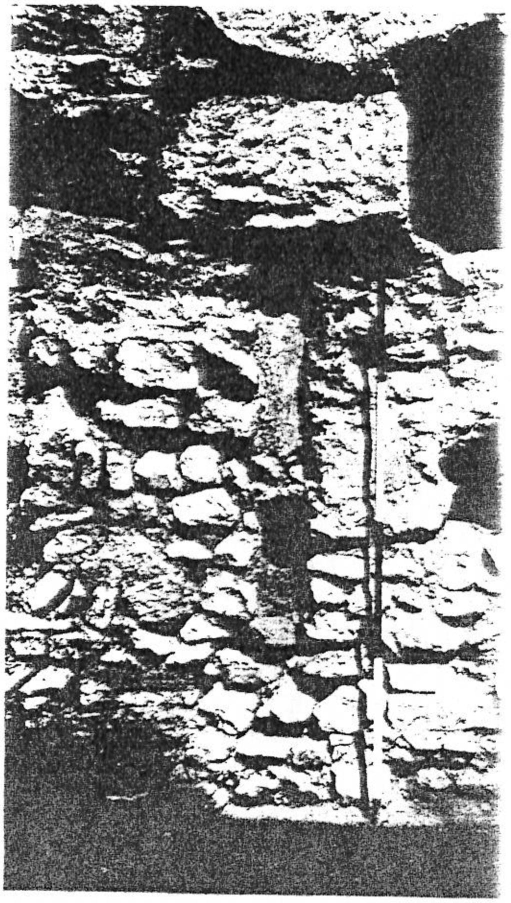

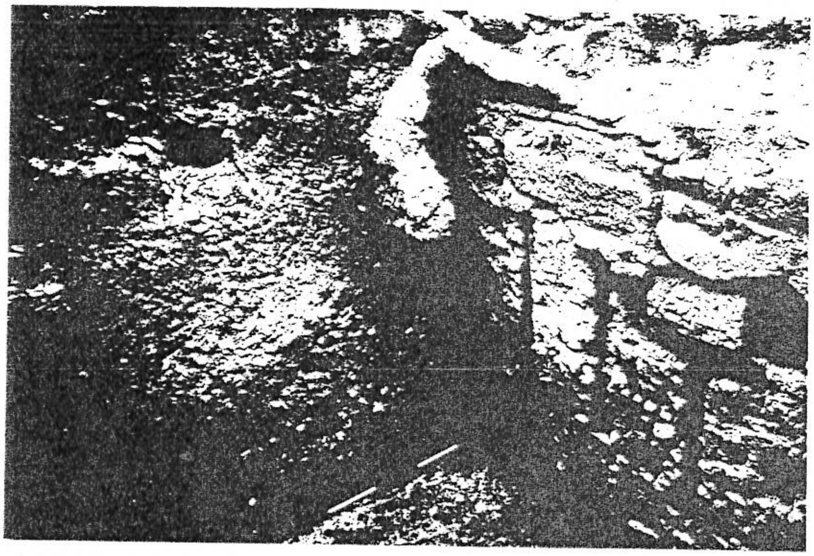
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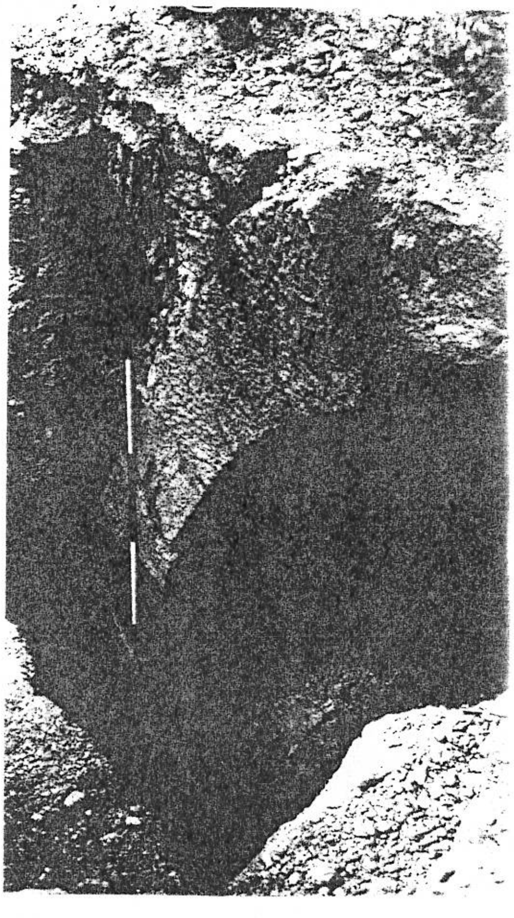
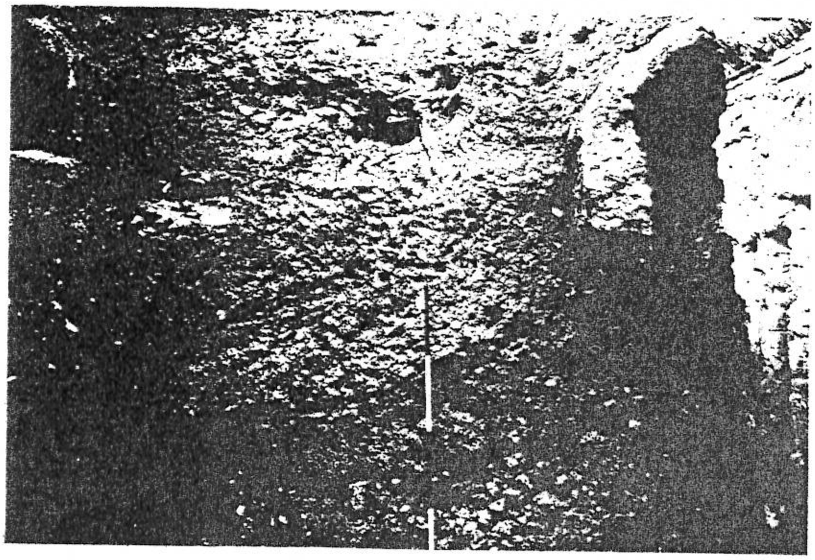
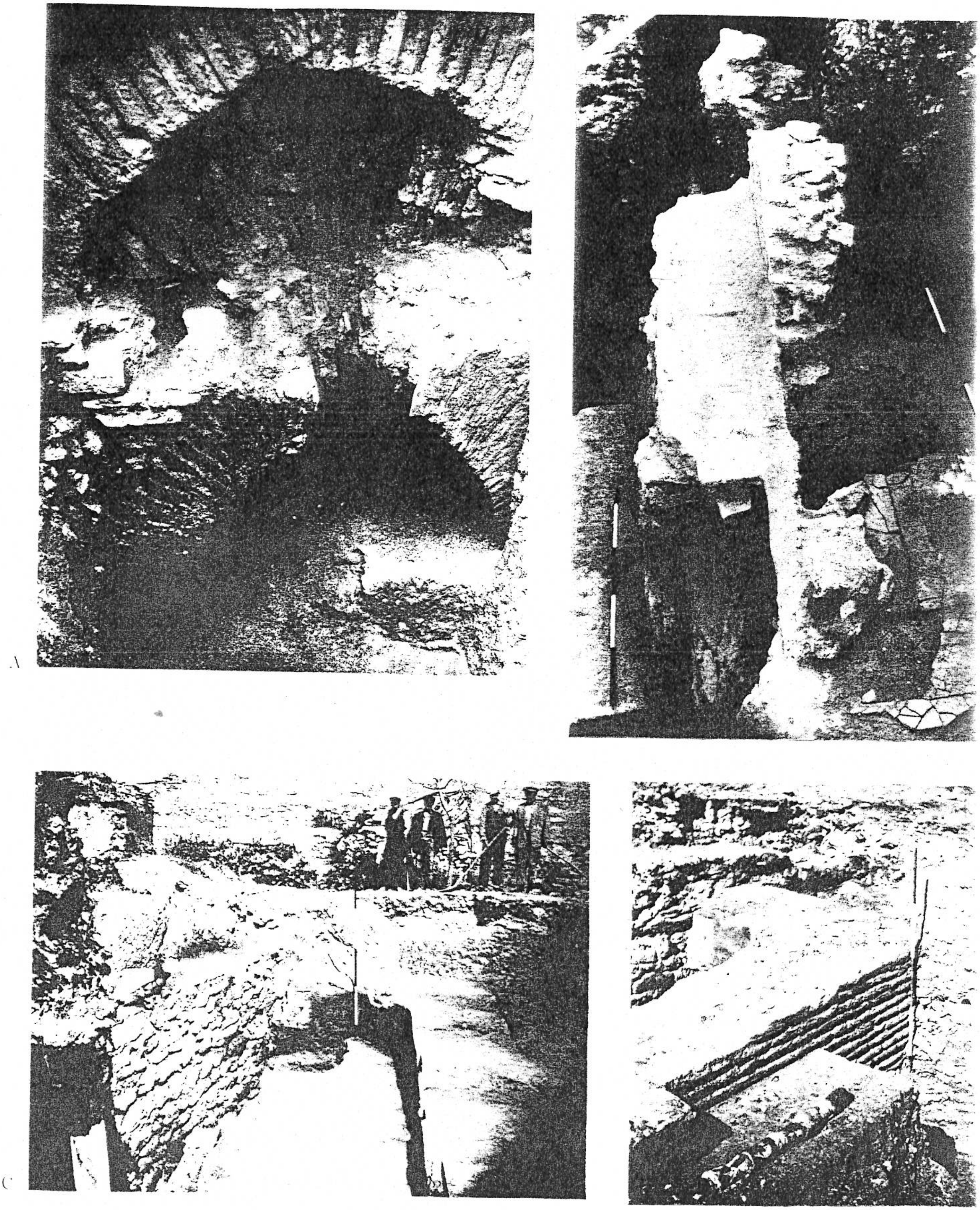



C

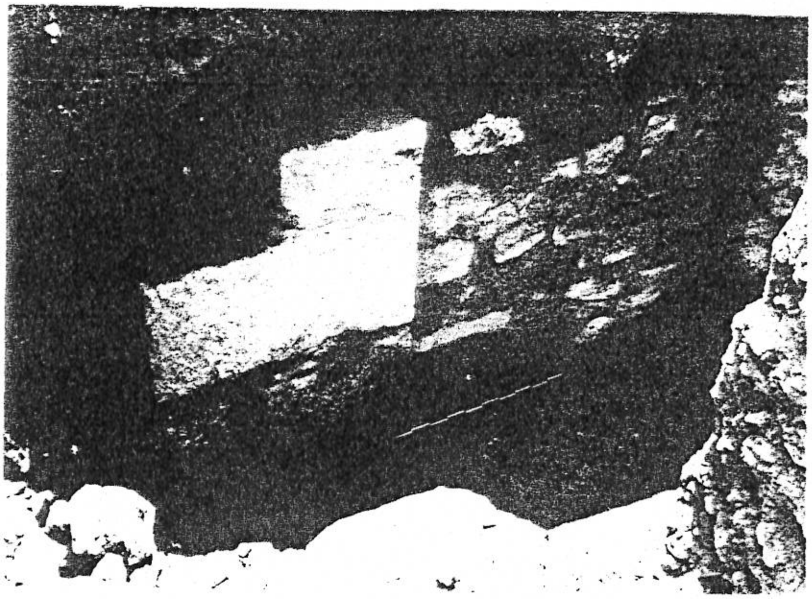
NORTH-EAST END OF NORTH-WEST PORTICO

A, B. Outer wall, showing imprint of concrete shuttering.
C. The filling, with vaulted conduit (See Fig. 4)

D. Outer wall with drain cut through it.
E. Stone foundation-arch to support wall of reconstruc



A. Face of Paved Way at centre of the Peristyle Court (Fig. 5). B. Floor of 'Piano nobile' of Apsed Hall.
C, D. Building below the S.W. portico.



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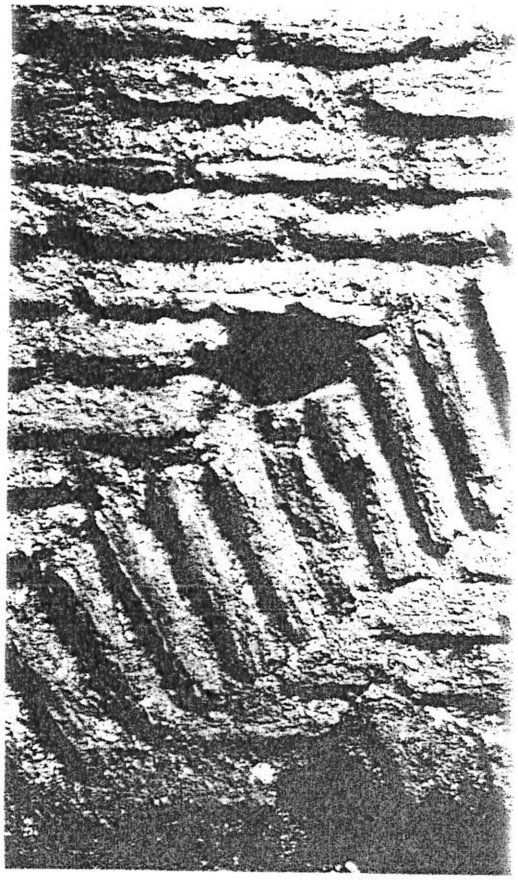

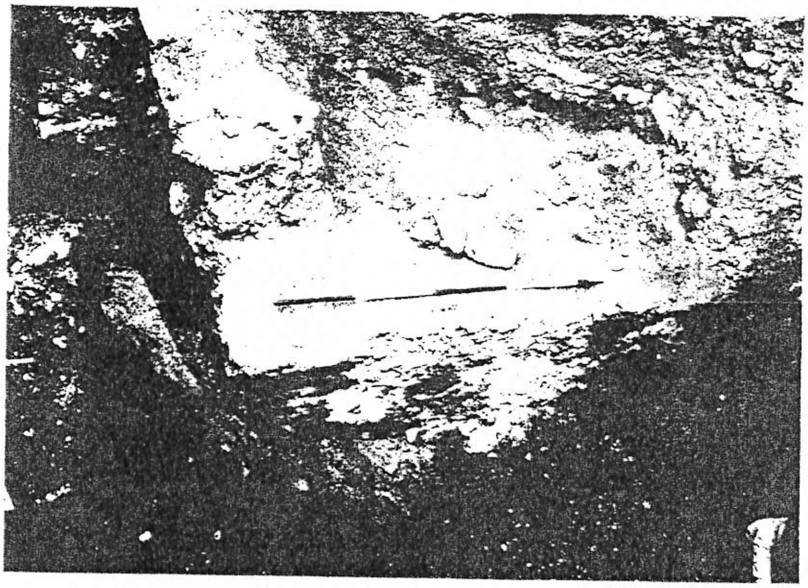

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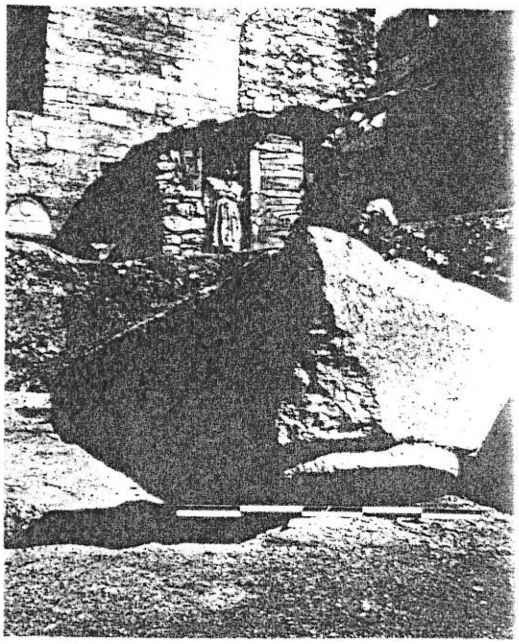
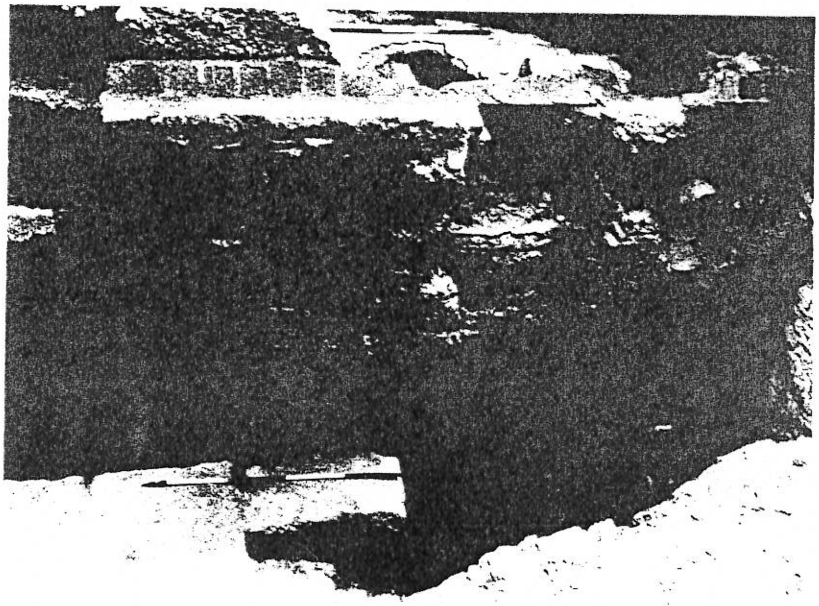




C

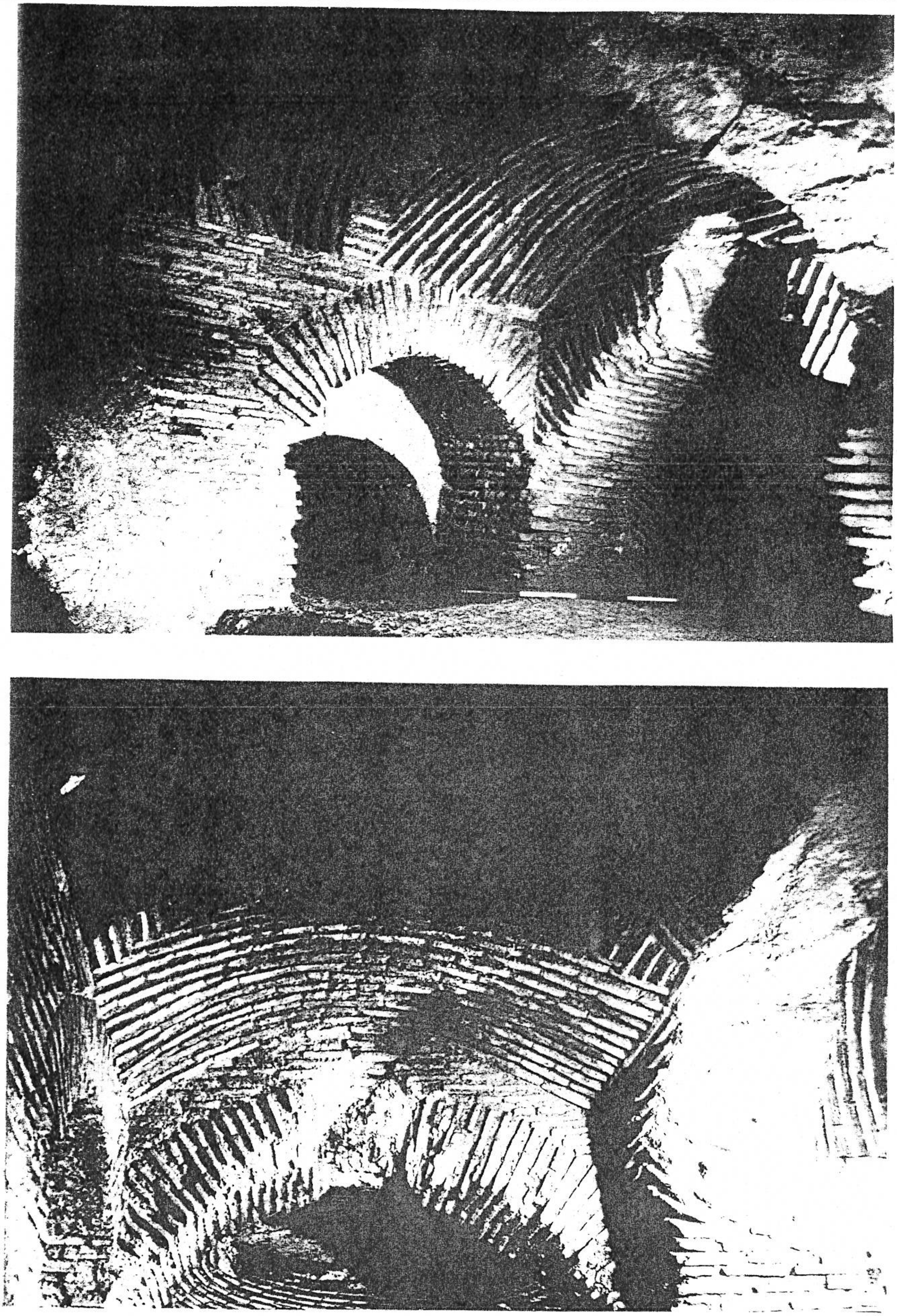
A. Corner of outer wall of S.E. portico.

B. Paved way at junction with Apsed Hall.

C. Floor of 'piano nobile' of Apsed Hall a
entrance to Chamber B (Fig. 10).

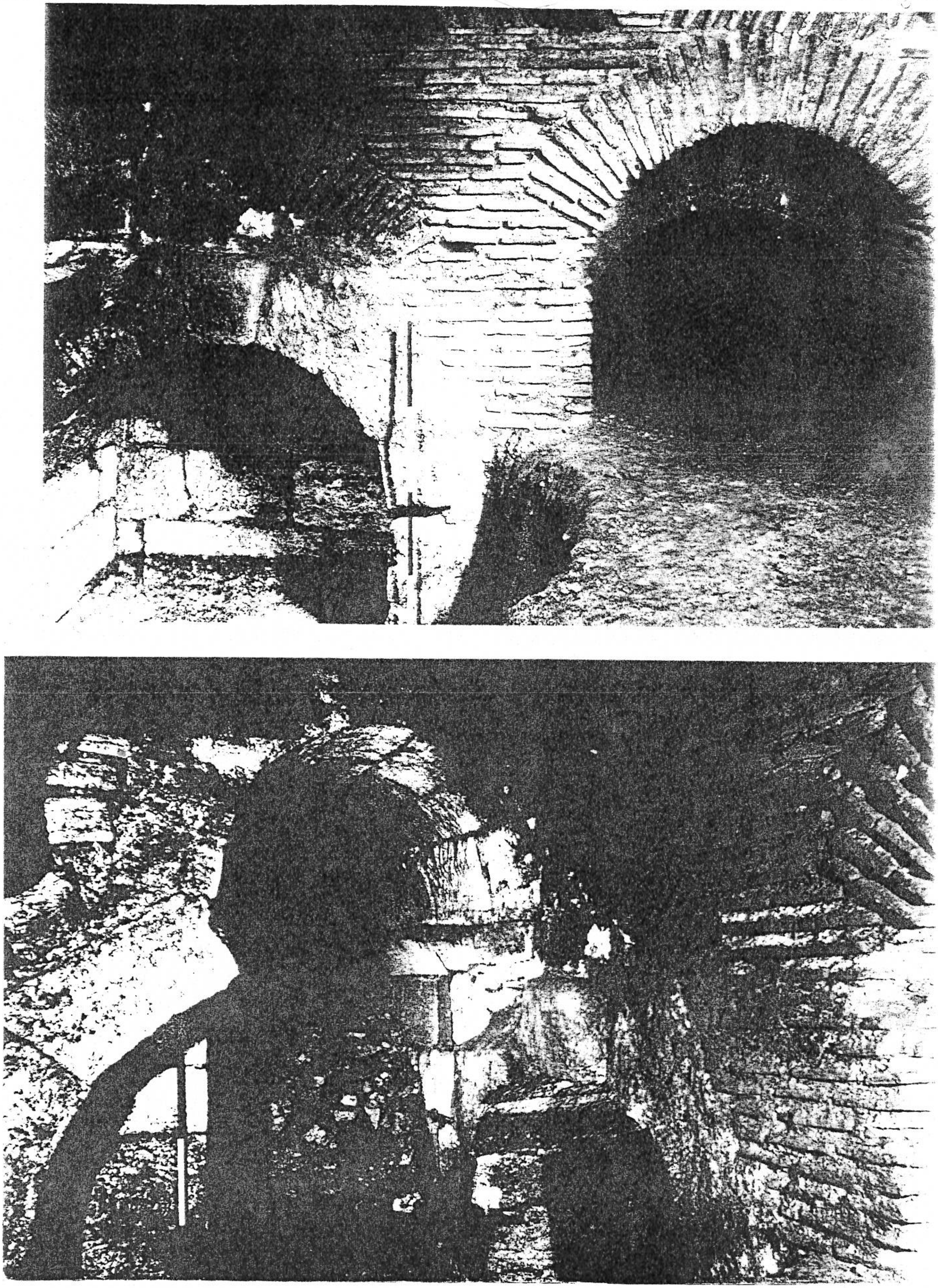
D. Detail of outer face of N.W. wall of Chamber

E. Capital from building below Peristyle



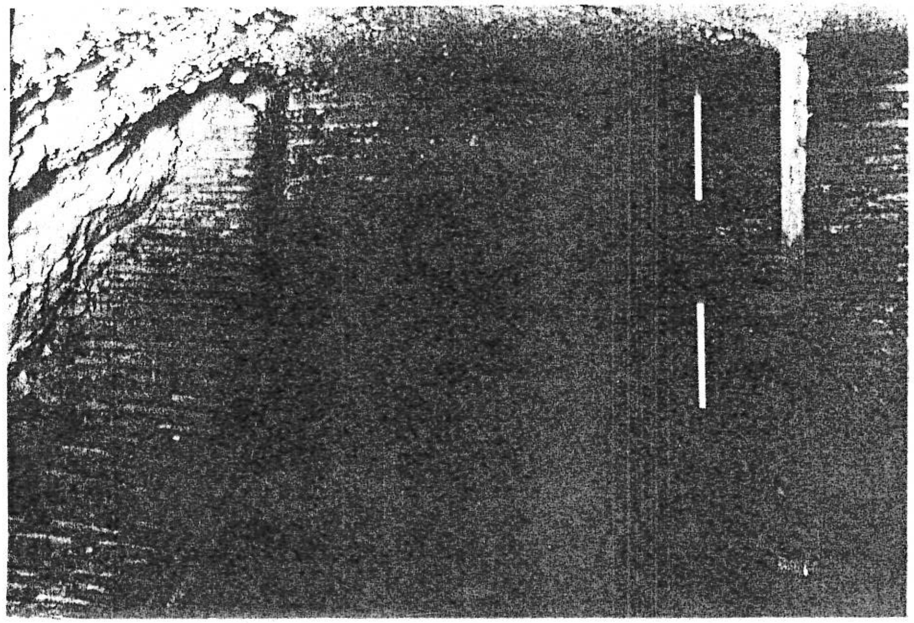
SUBSTRUCTURES OF ANTECHAMBER OF APSED HALL, CHAMBER A (Fig. 11)

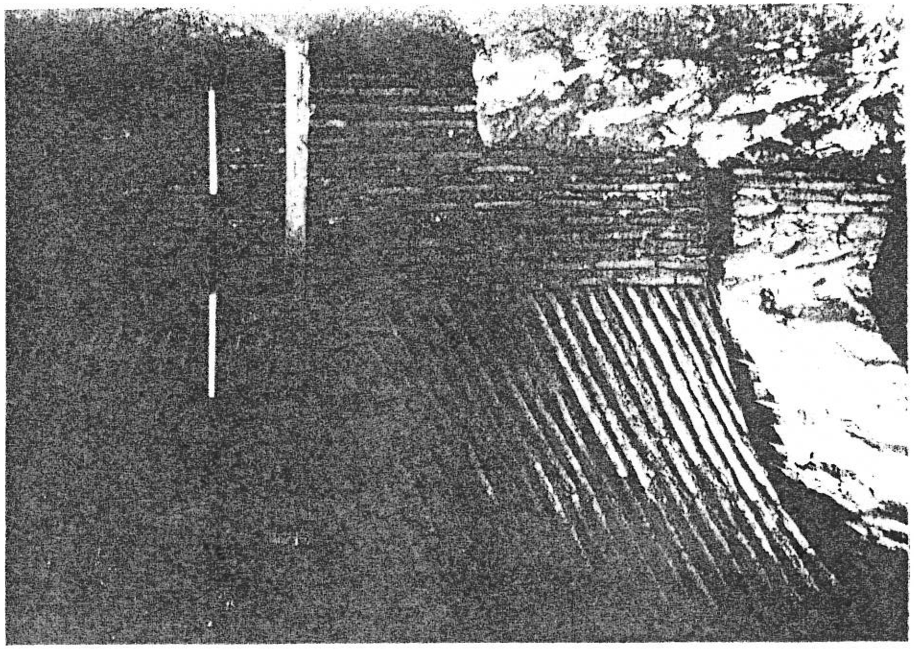
A. Looking towards S.W. wall. B. Looking towards Chamber B and corner of Chamber D on the right.

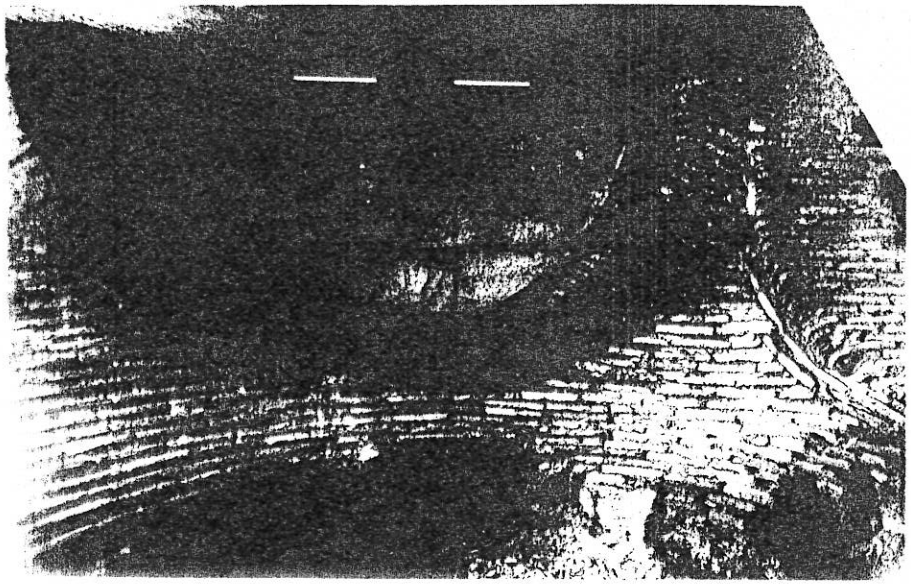


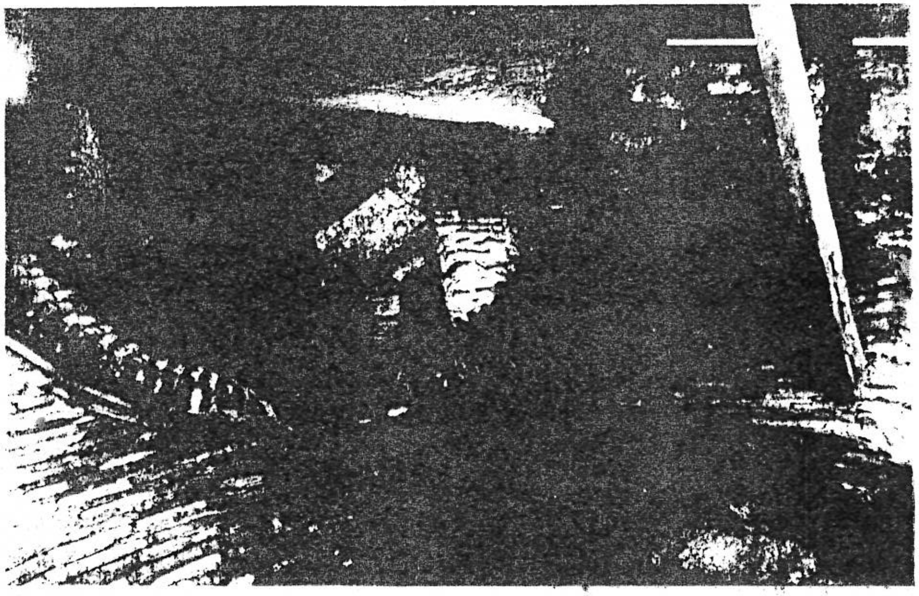
SUBSTRUCTURES OF ANTECHAMBER OF APSED HALL CHAMBER A (Fig. 11)

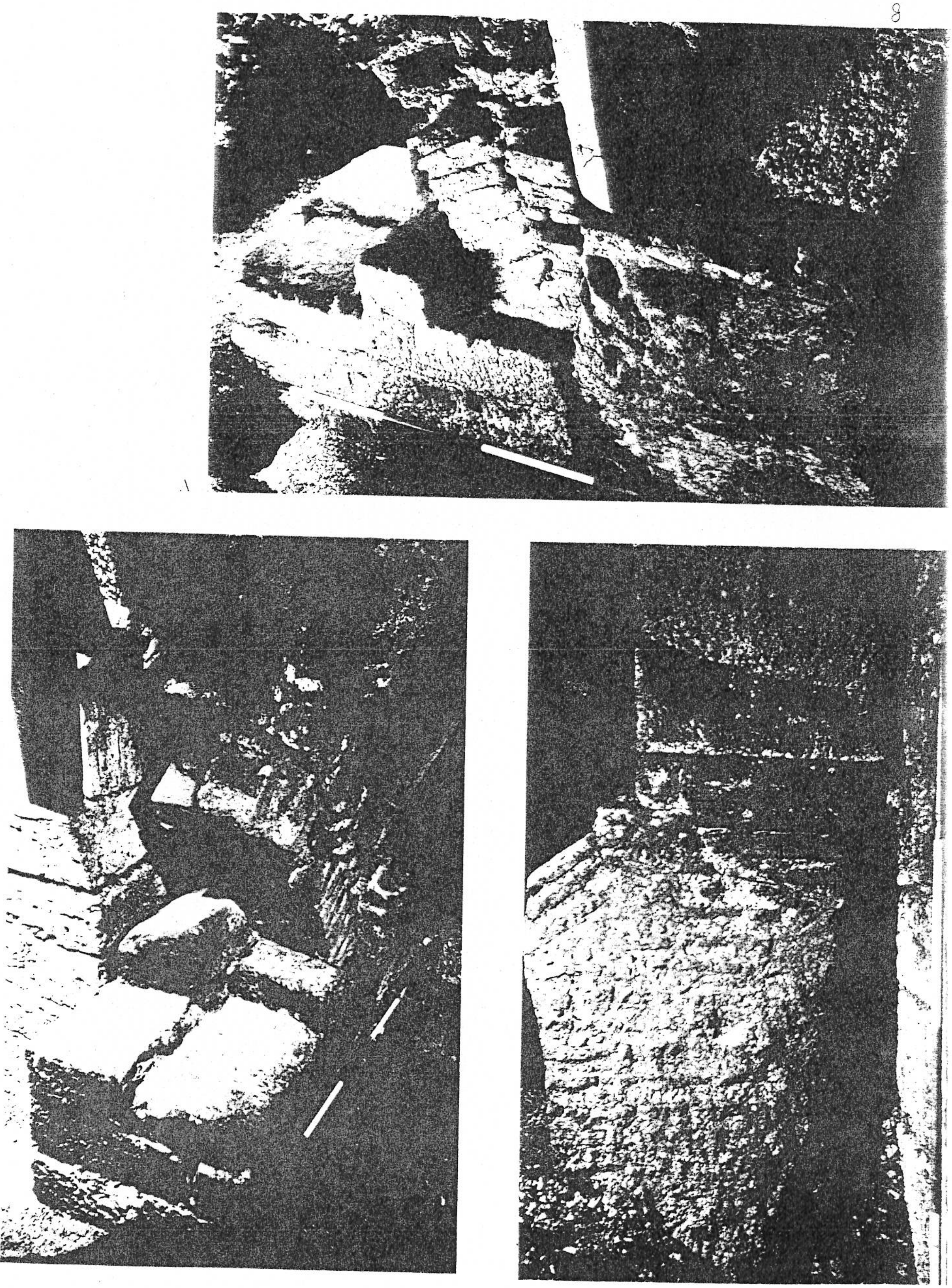
A. Looking towards S.W. wall. B. S.W. opening through transverse wall.







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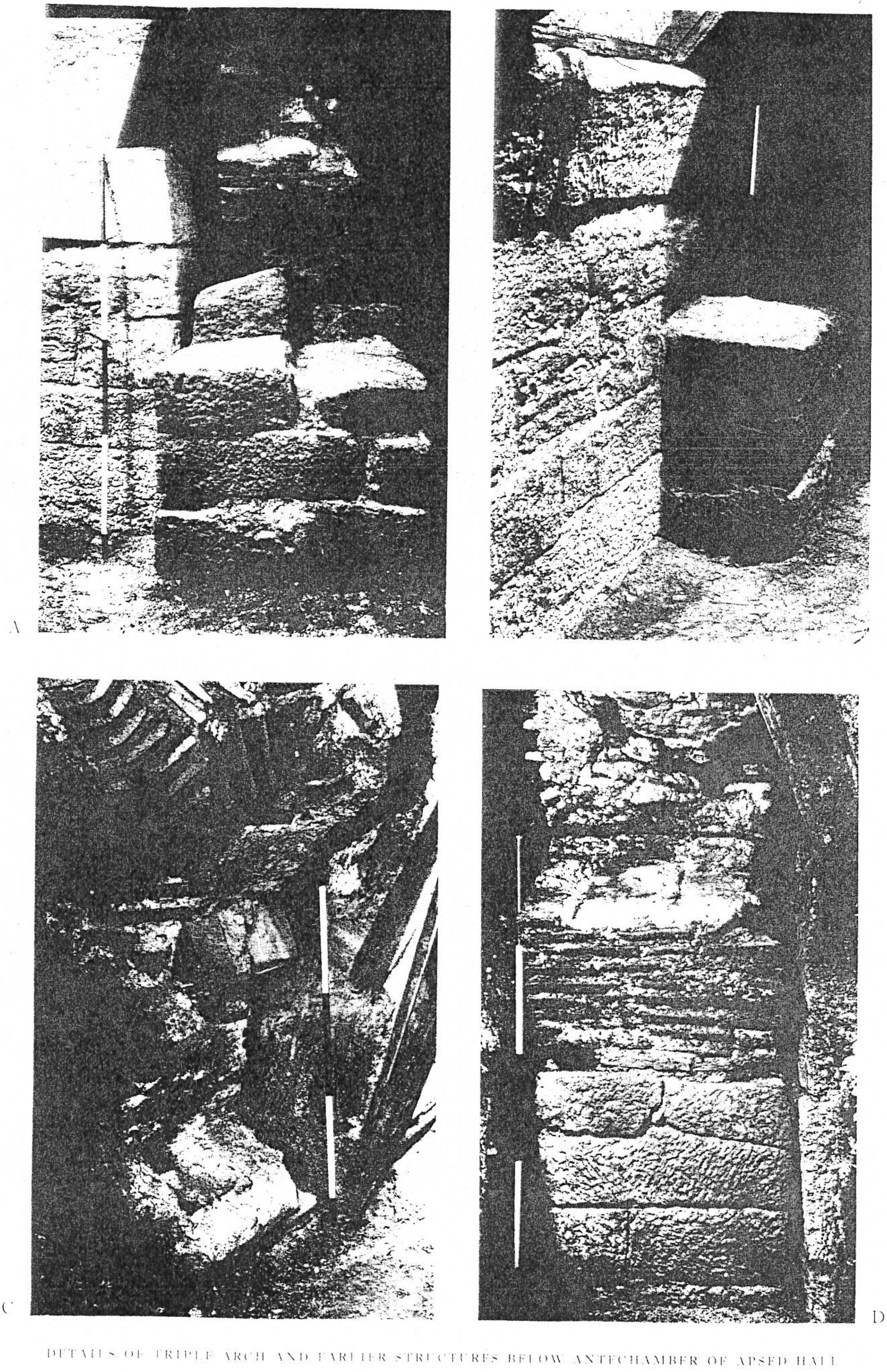
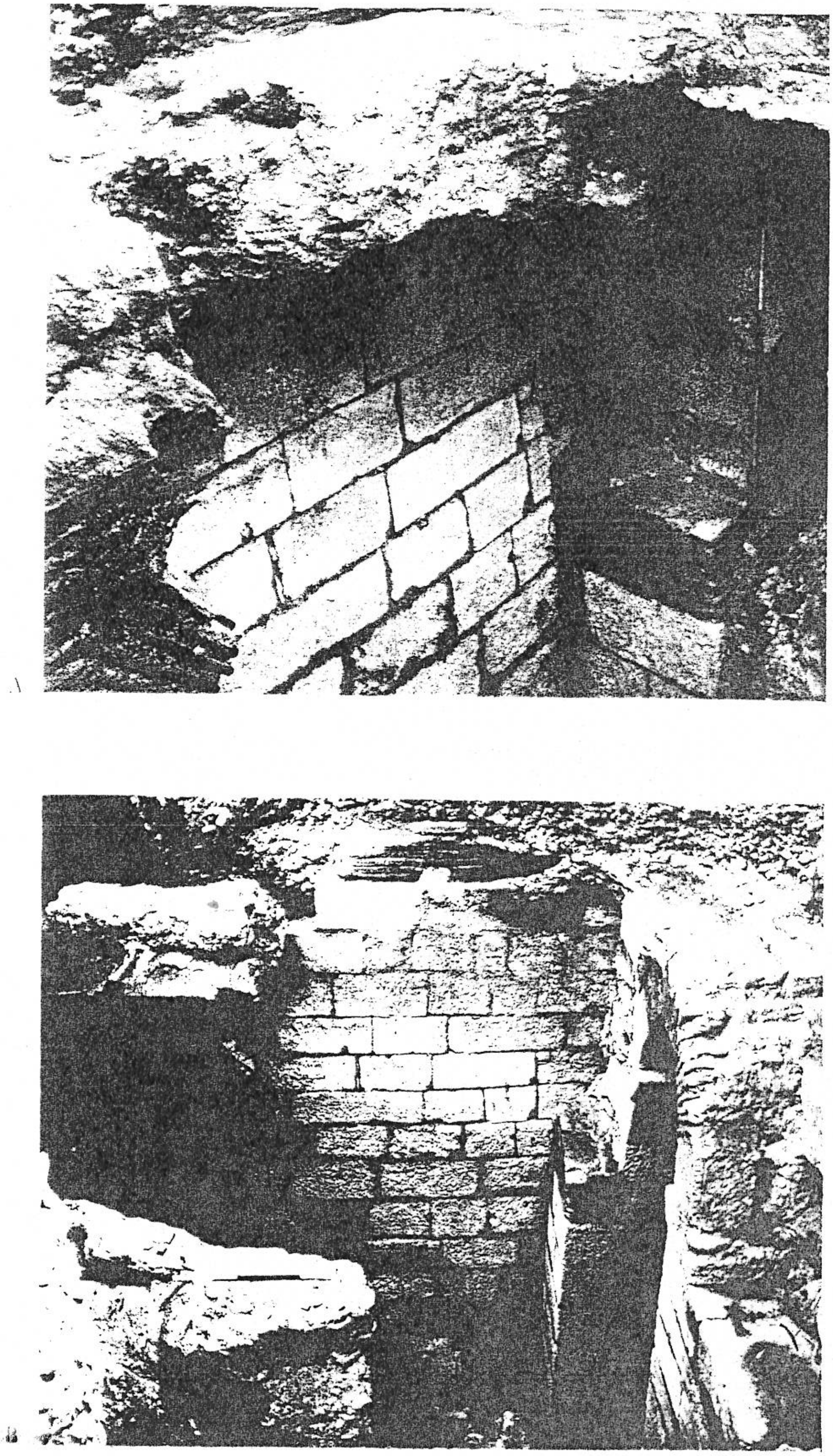
B

DETAILS OF EARLIER STRUCTURES BELOW ANTECHAMBER OF APSED HALL

7



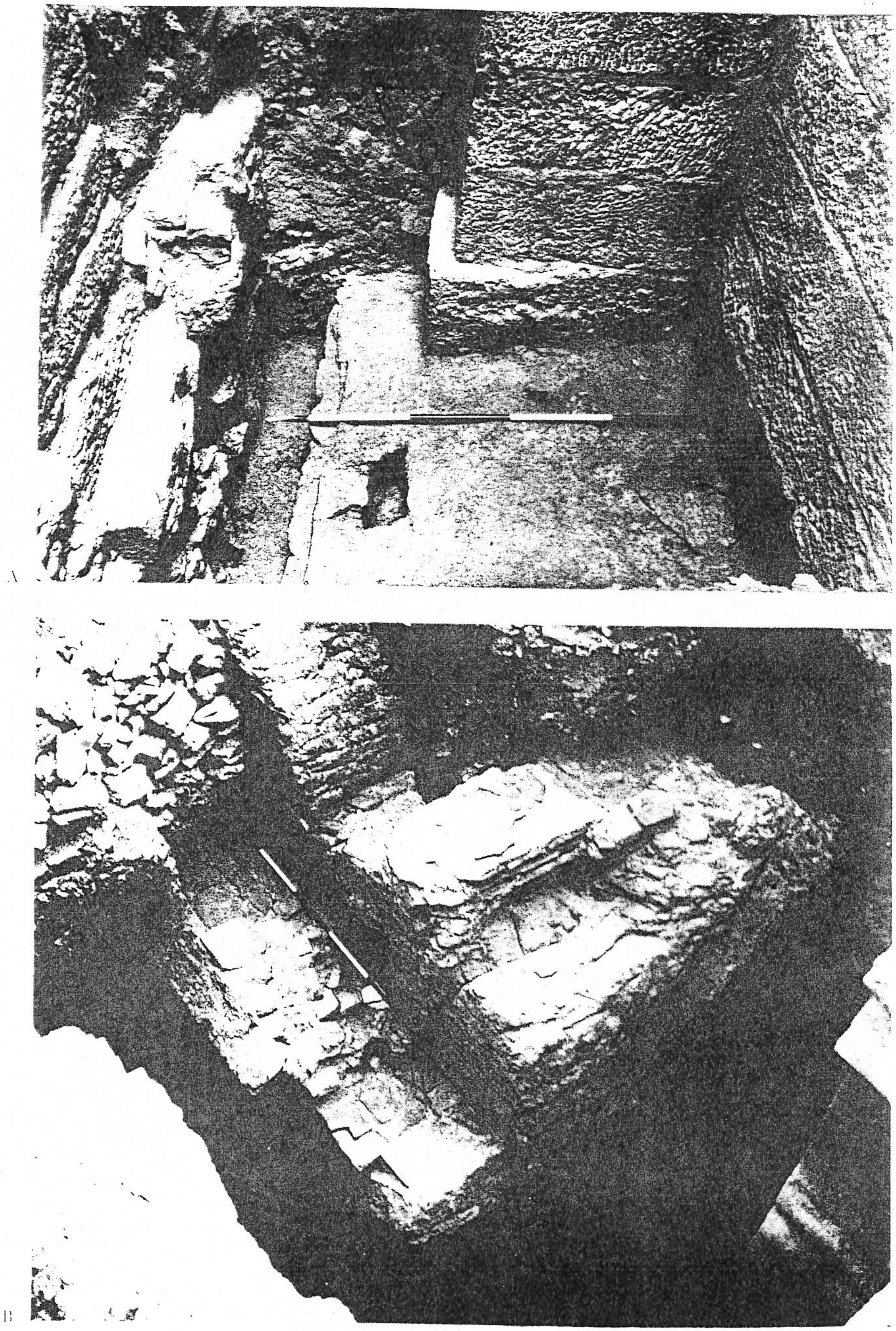
DETAILS OF TRIPLE ARCH AND EARLIER STRUCTURES BELOW ANTECHAMBER OF APSED HALL



DEEP EXCAVATION AT CORNER OF A

A. S.W. wall and brick arch supporti

B. S.W. wall with arch removed.



DEEP EXCAVATION AT CORNER OF APSED HALL (Fig. 12)

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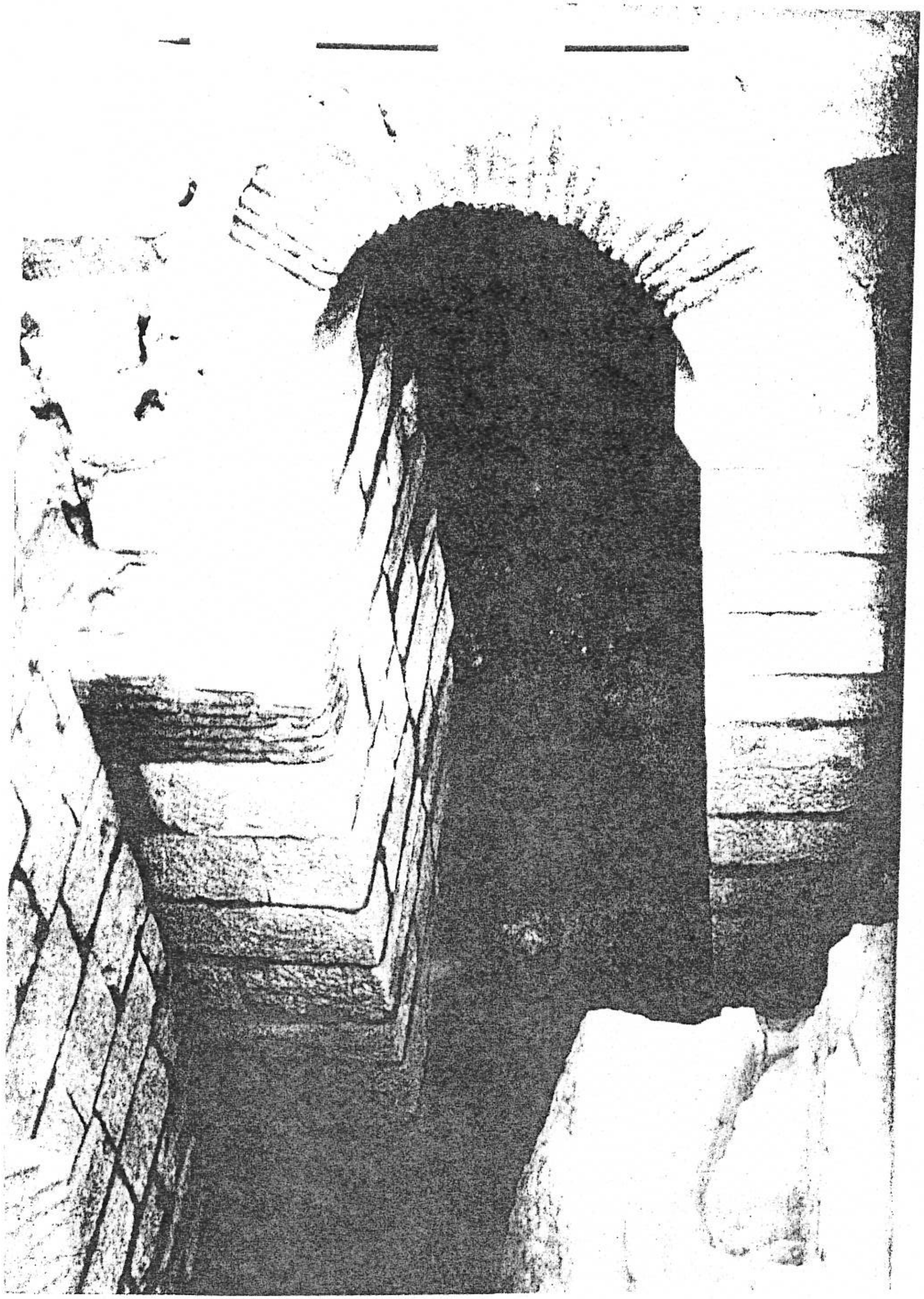
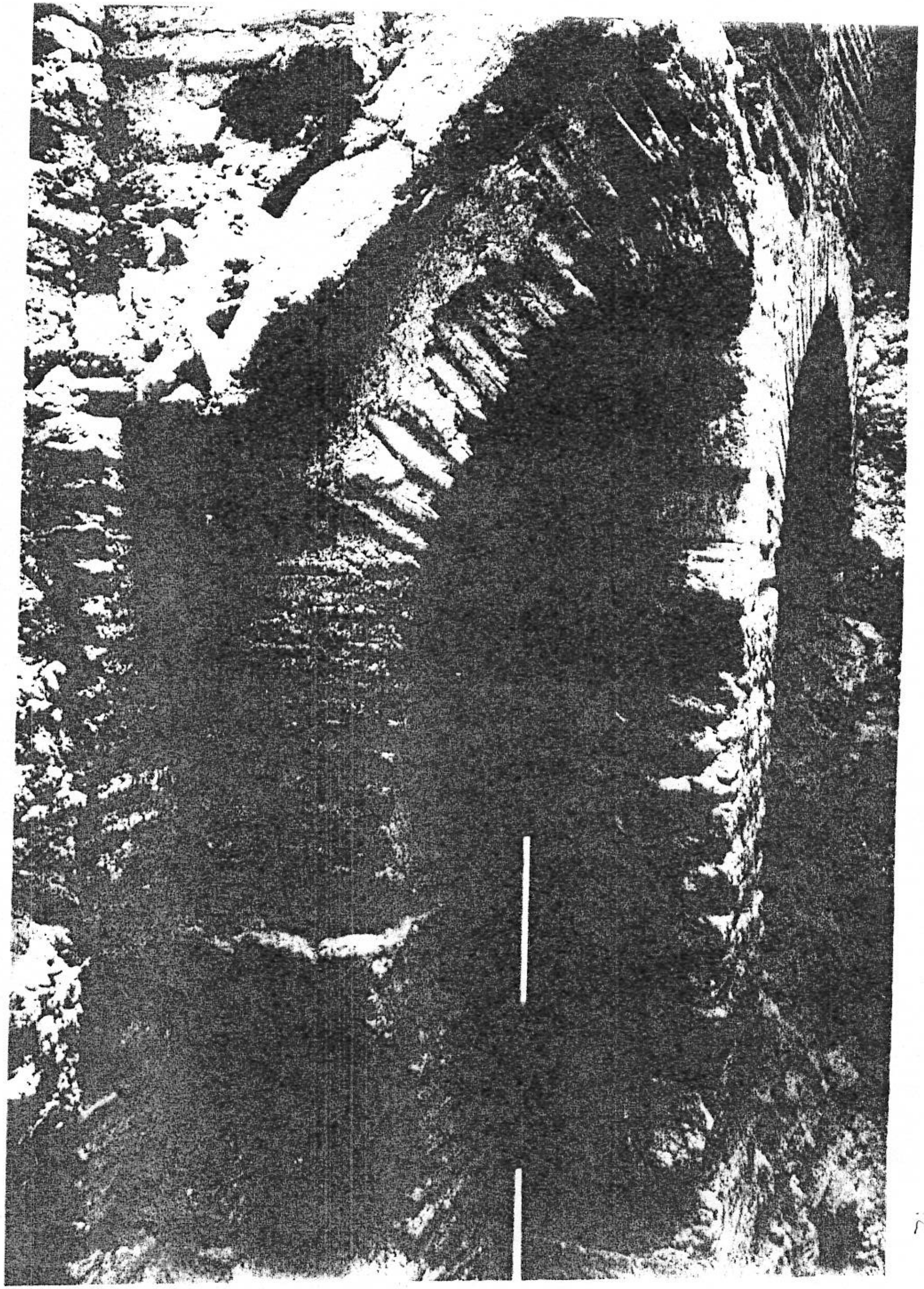
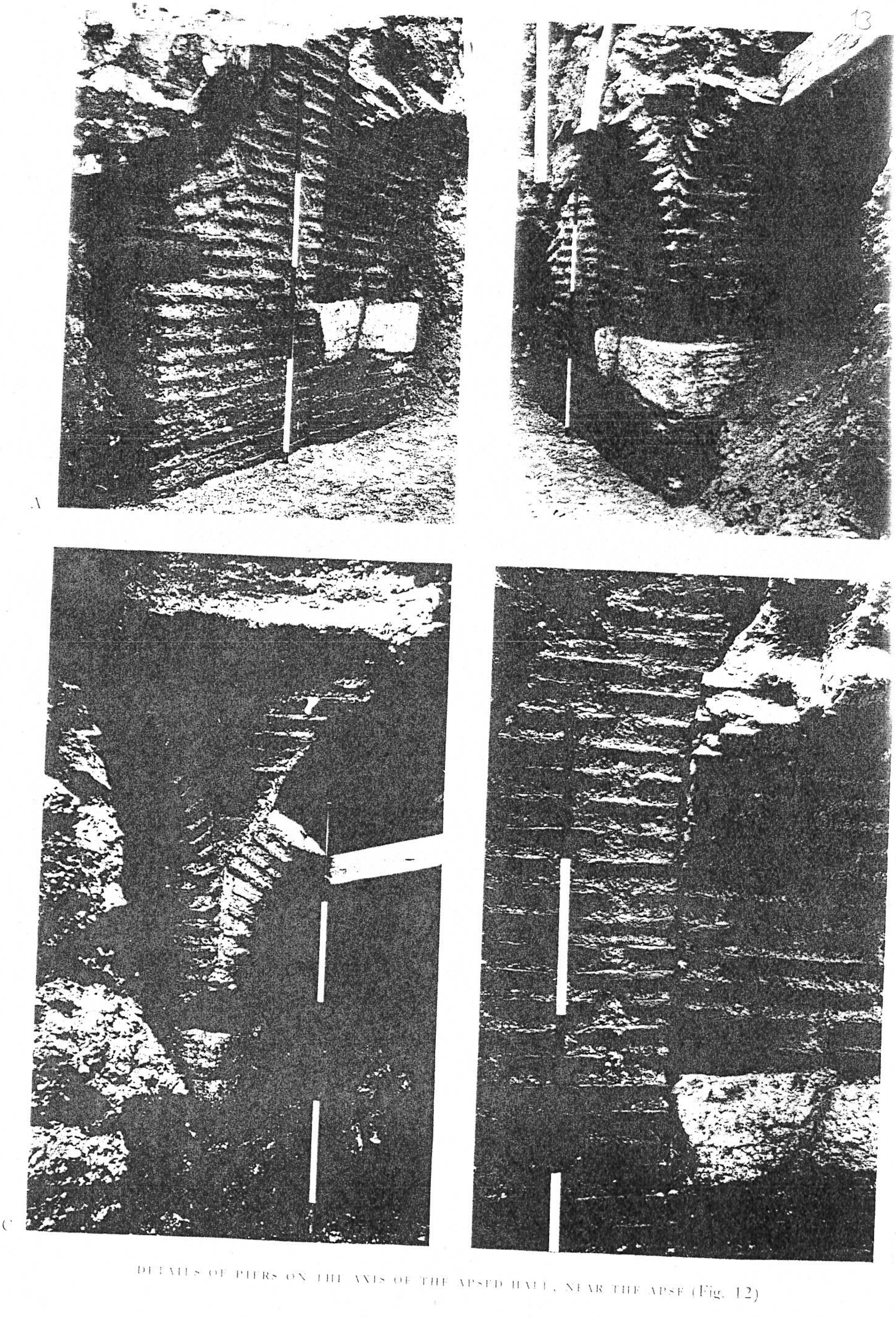
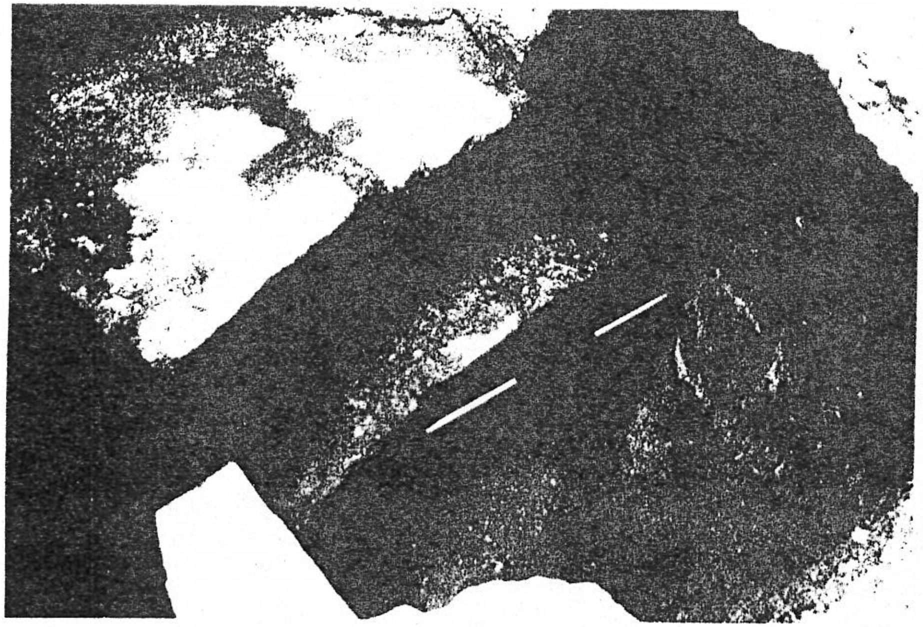






DETAILS OF PIERS ON THE AXIS OF THE APSED HALL, NEAR THE APSE (Fig. 12)



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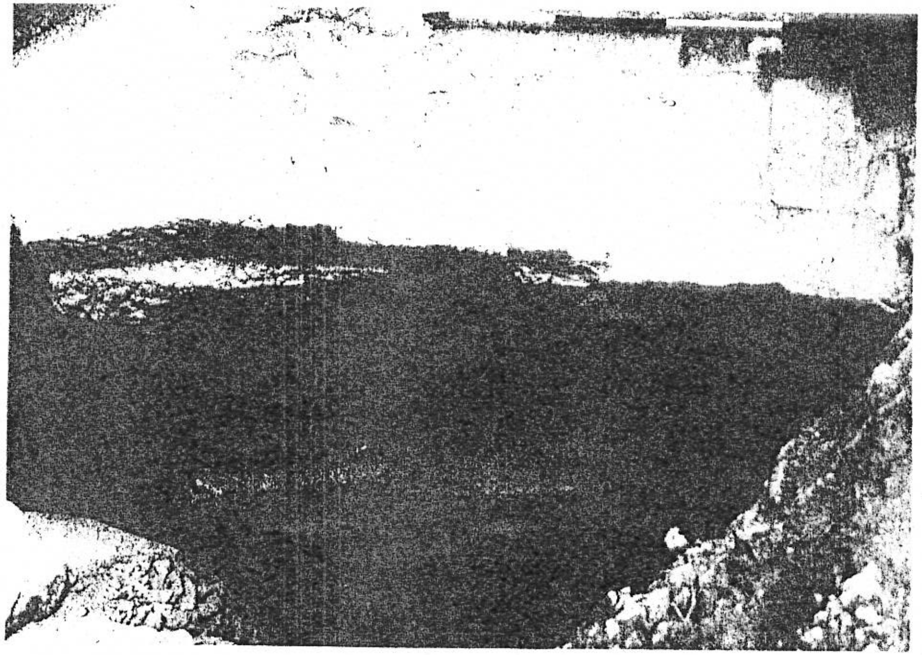

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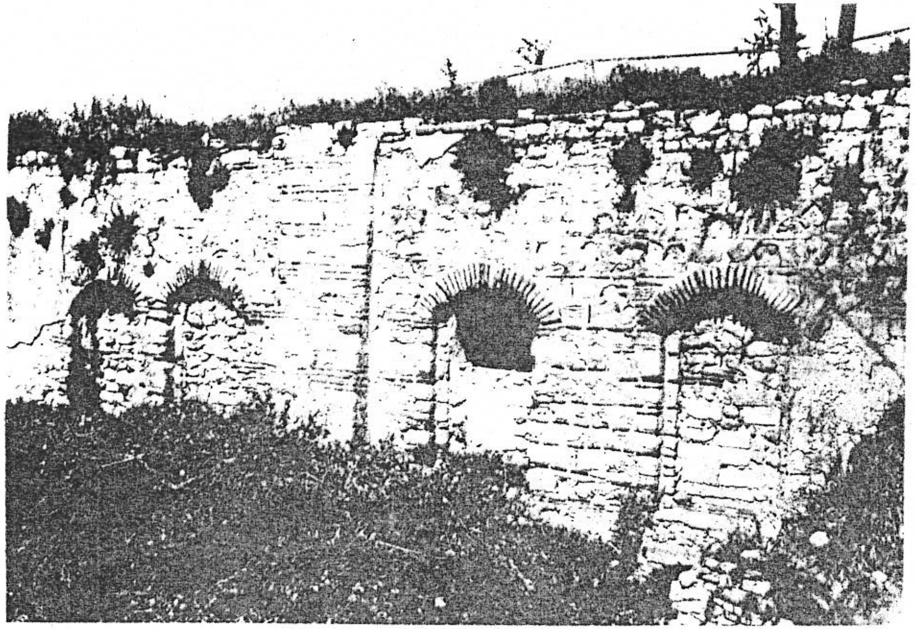

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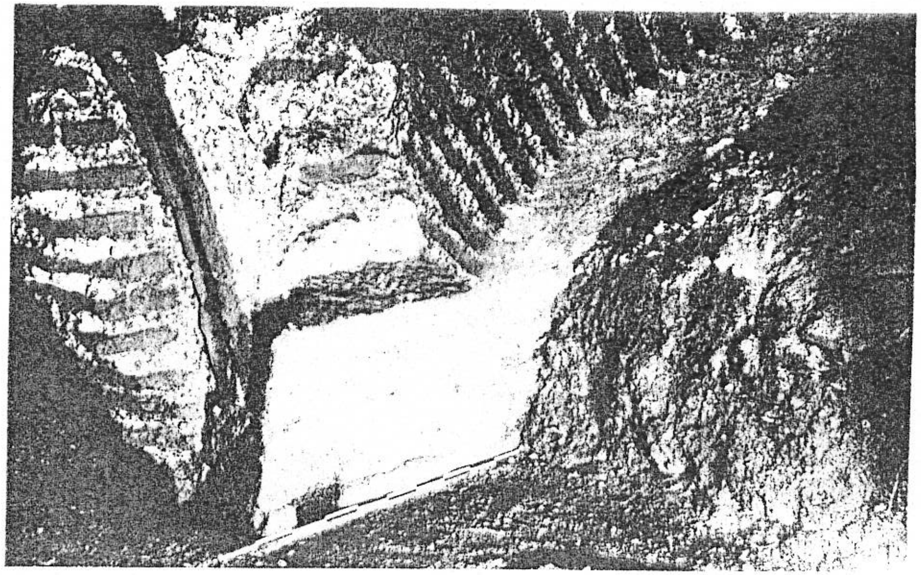

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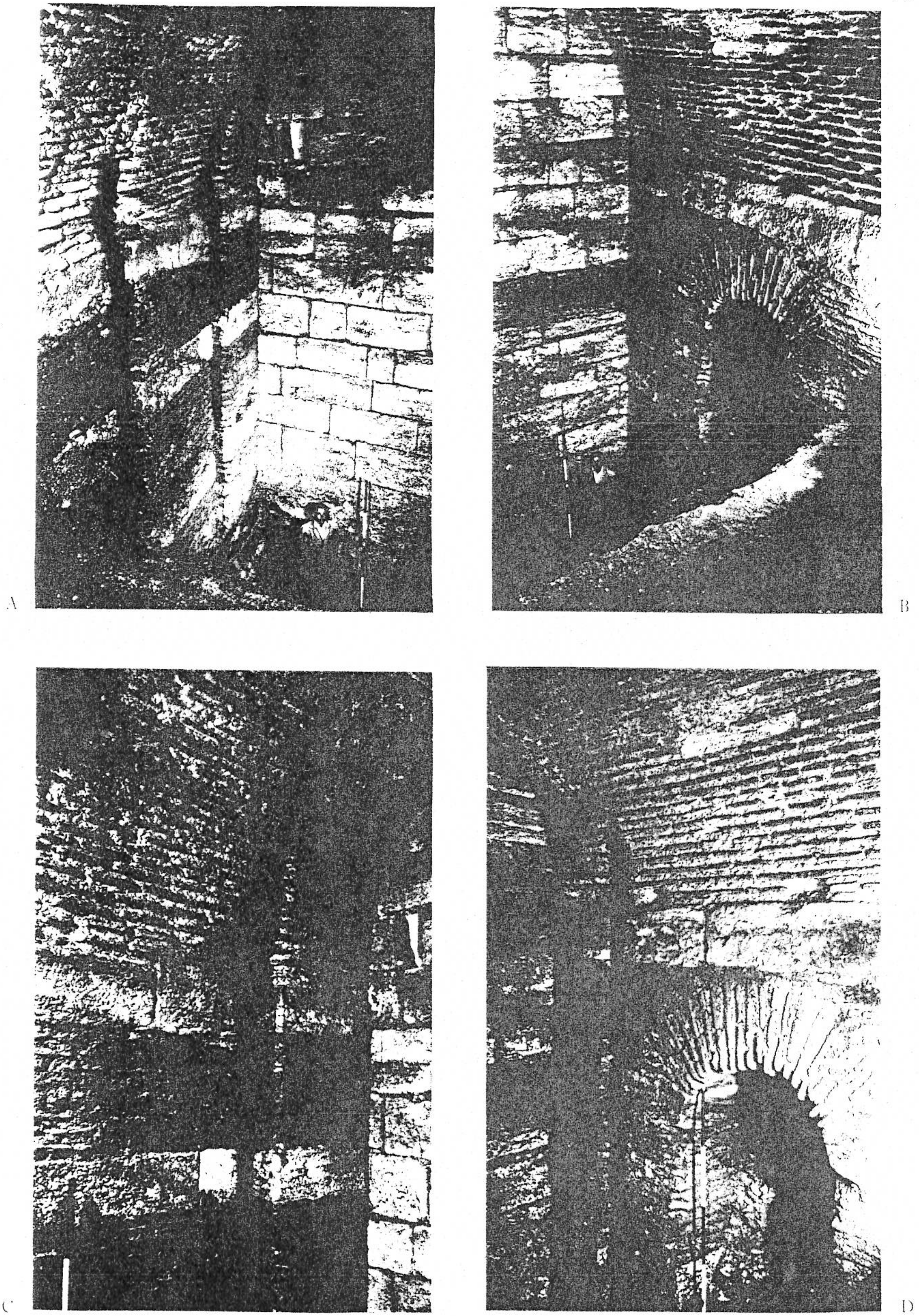
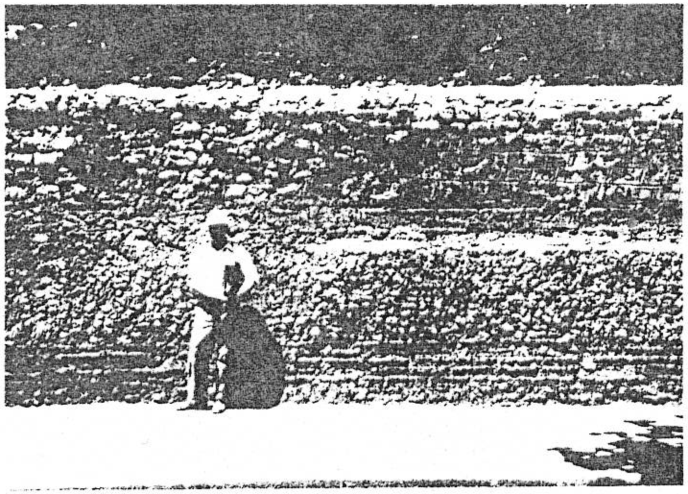


VAULTED CHAMBERS TO THE SOUTH-WEST OF THE APSED HALL (MAMBOURY DC.)



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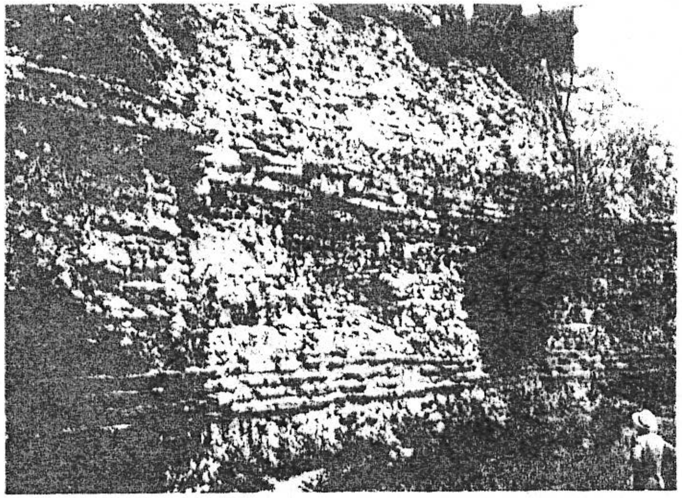

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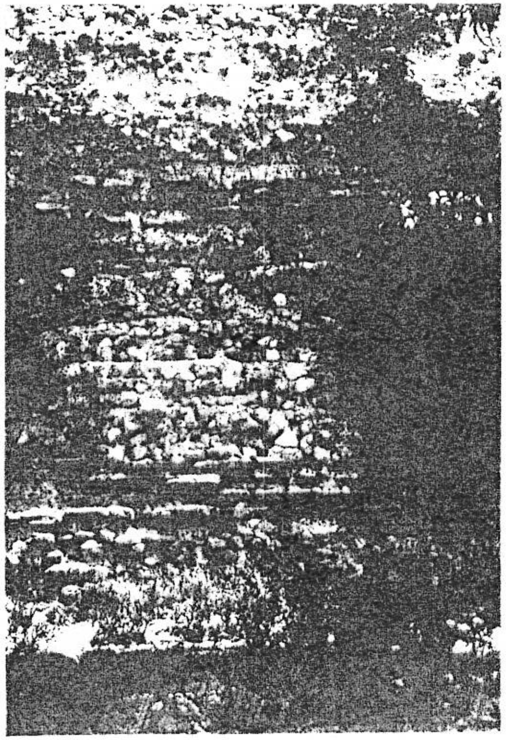

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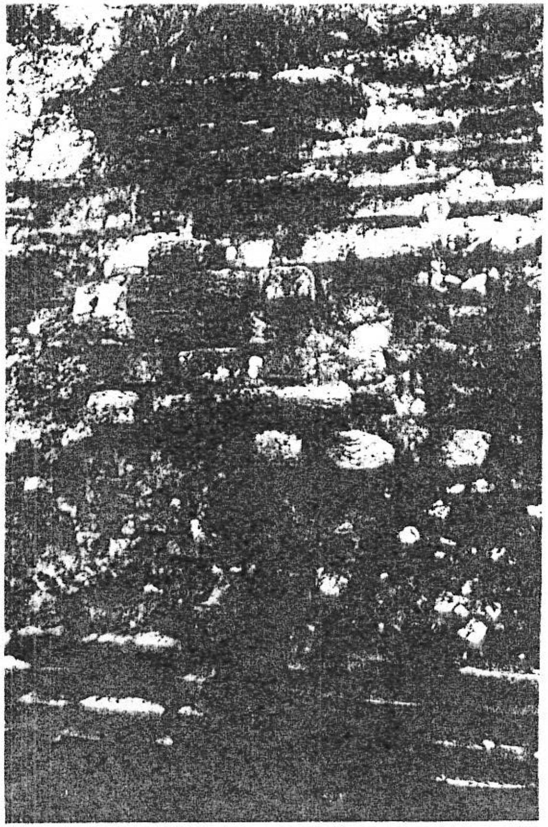

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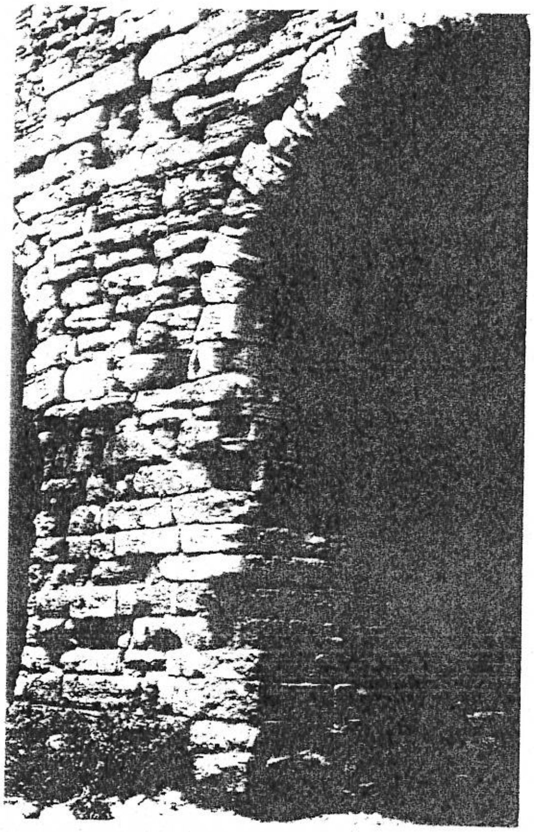
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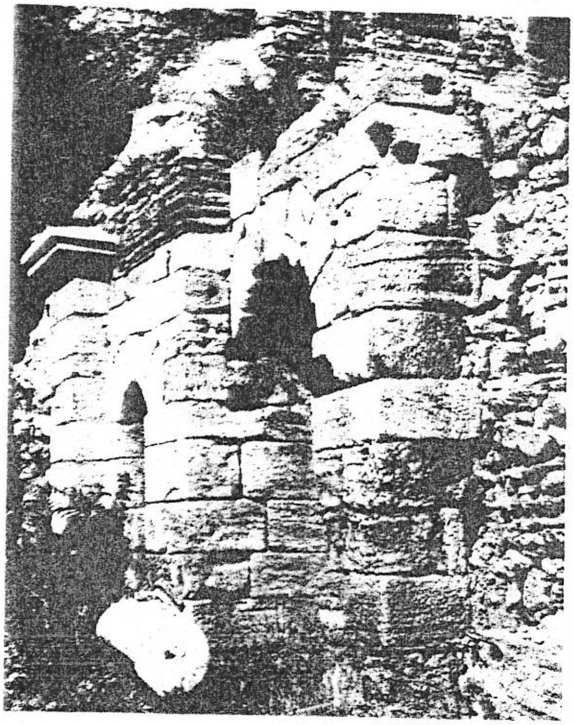
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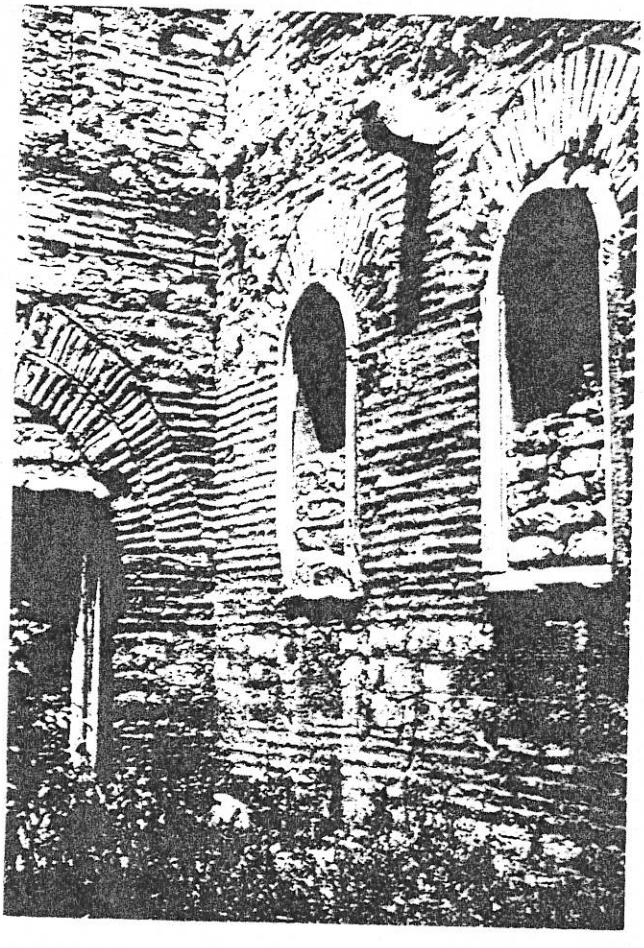
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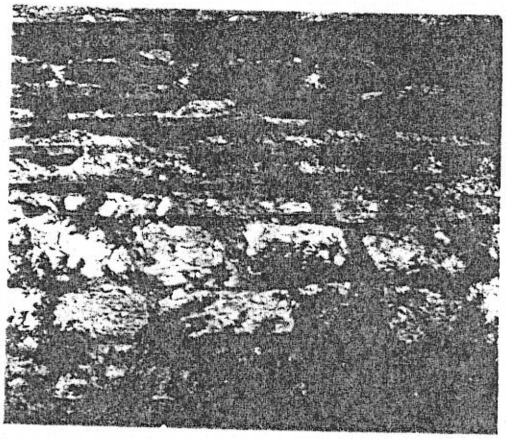
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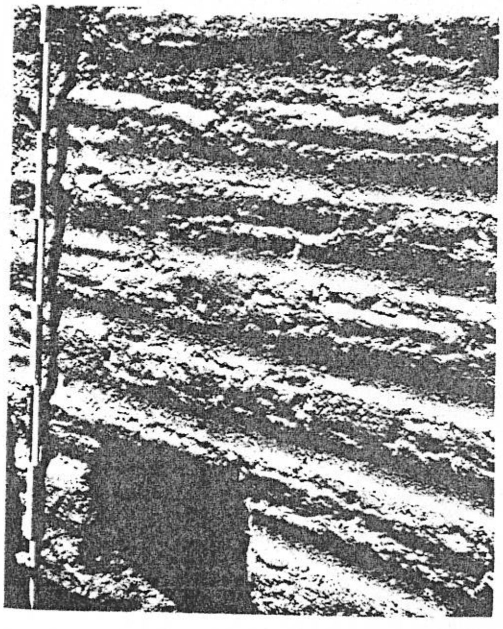
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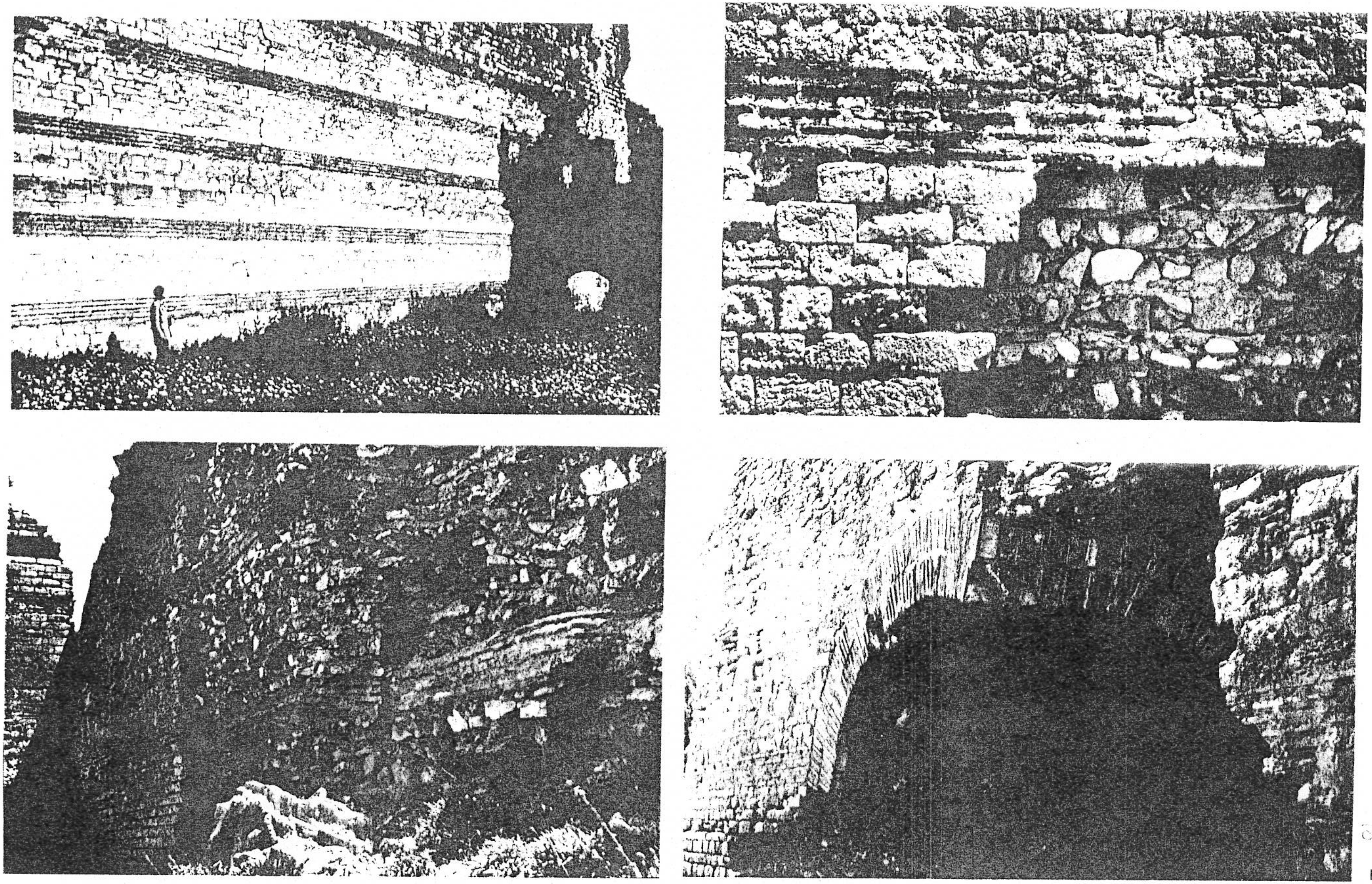
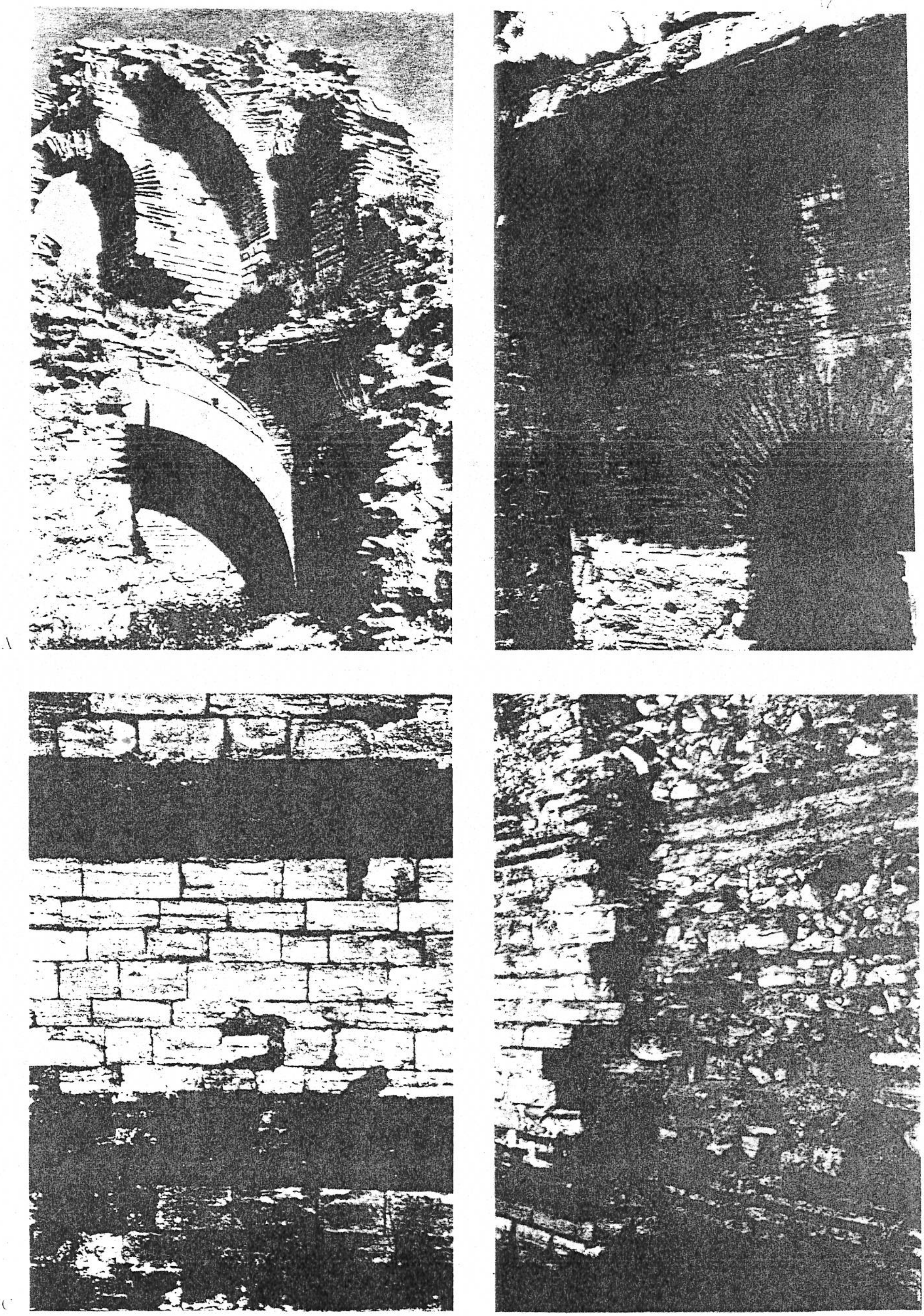
CONSTANTINOPLE

A. Aqueduct of Valens, A.D. 368. B. Church of St. John of Stoudios, A.D. 463.
C. Excavations adjoining Church of St. Eirene, 6th century. D. Hagia Sophia 1st Church, A.D. 360.
E. The Palace [illegible] Theodosius.

D



CONSTANTINOPLE. THE THEODOSIAN LAND WALLS, *c.* A.D. 413

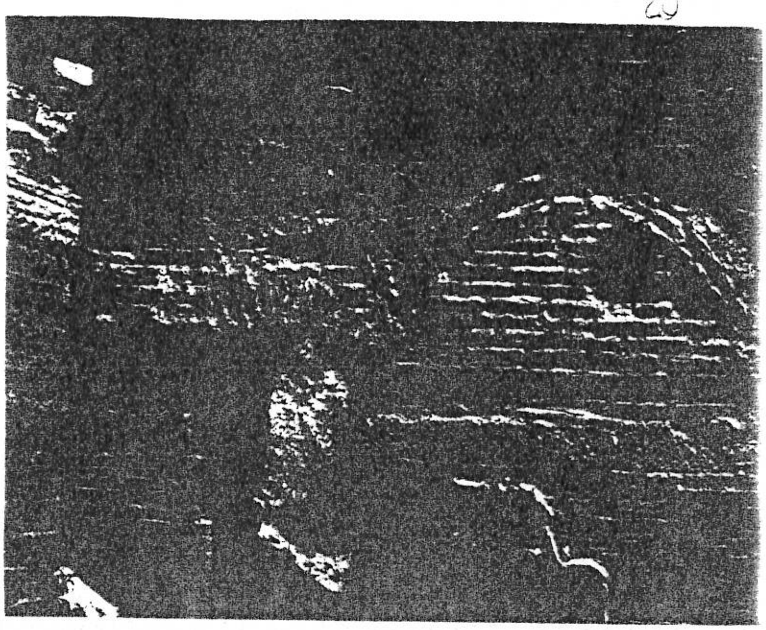


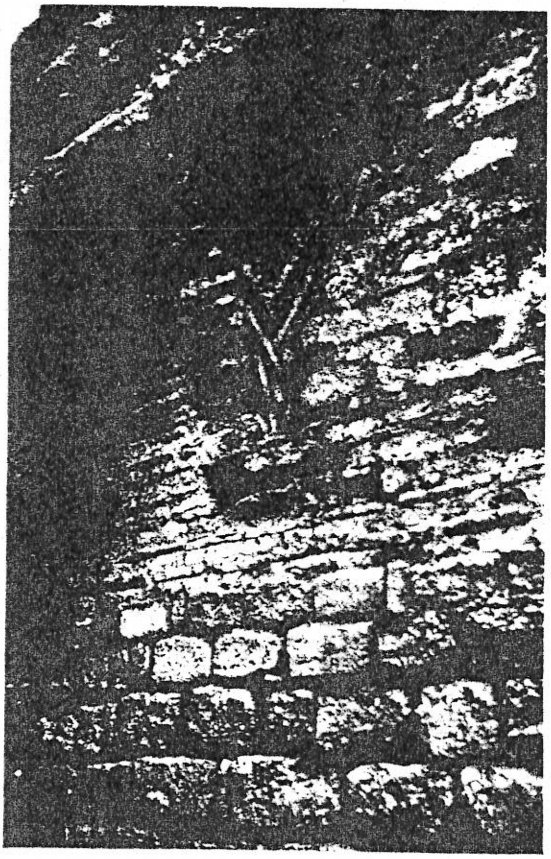
CONSTANTINOPLE. THE THEODOSIAN LAND WALLS c. A.D. 413

A. Tower 16, probably A.D. 447. B. Tower 55, A.D. 740.

20

A





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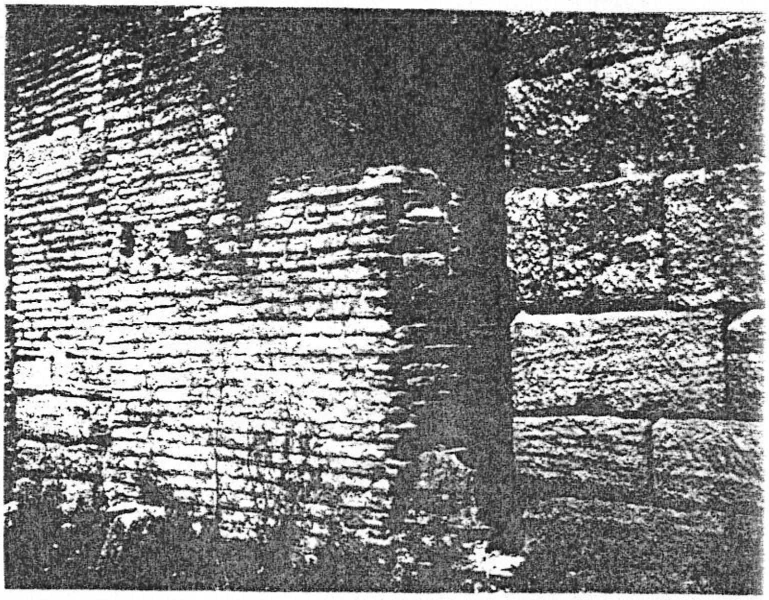
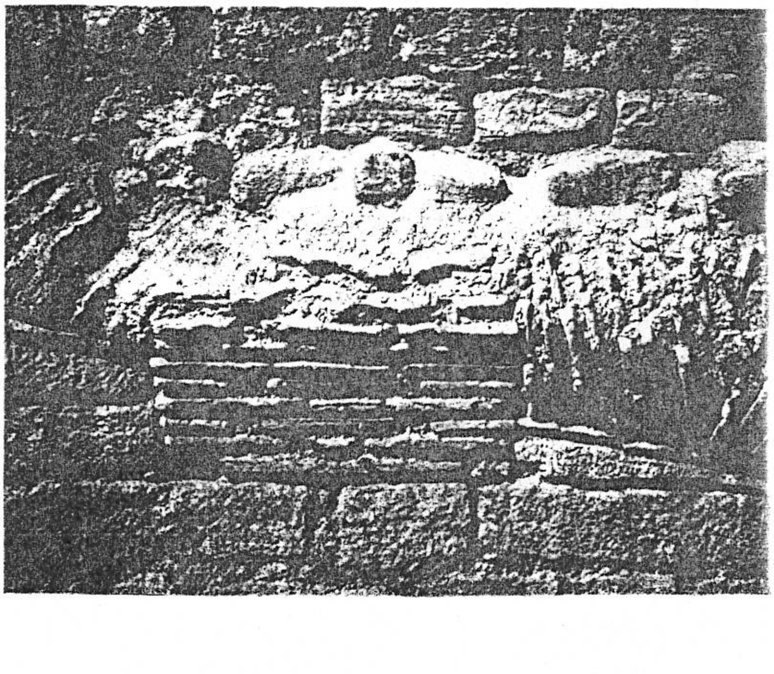
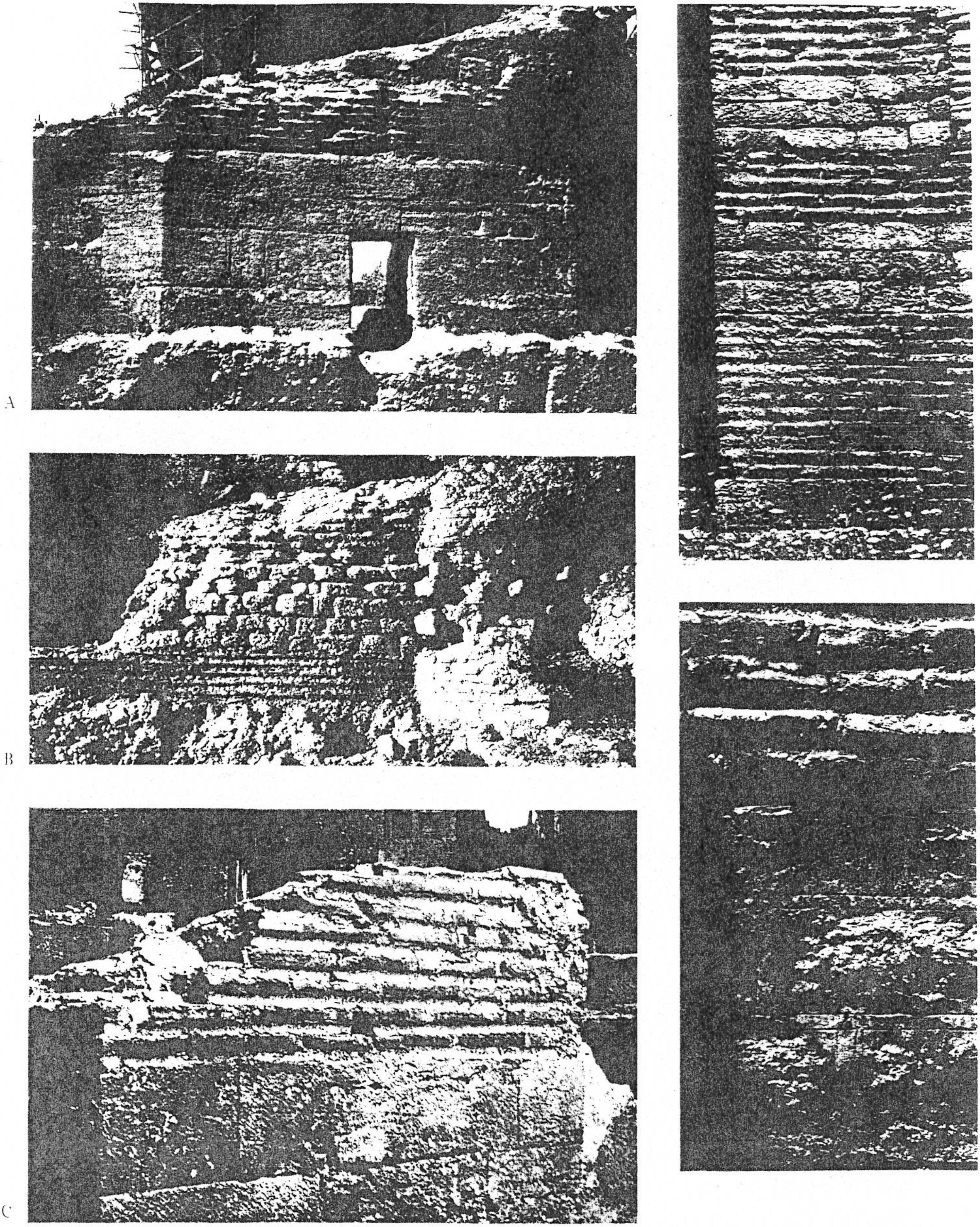




CONSTANTINOPLE

A. St. Eirene; vaulting of the narthex. 1st half of 6th century or after A.D. 564. B E. Buildings adjoining St. Eirene. B. Vaulting of E.-W. corridor. C. Outer N. wall of monumental courtyard. D. N. S. corridor. E. Vaulting of ramp. 1st half of 6th century or after A.D. 564.



CONSTANTINOPLE

A, C. Church of St. Euphemia, details of masonry, 5th century. D, E. Church of St. John of Stoudios, details of the mas
D. The Apse. E. The W. wall. A.D. 463.

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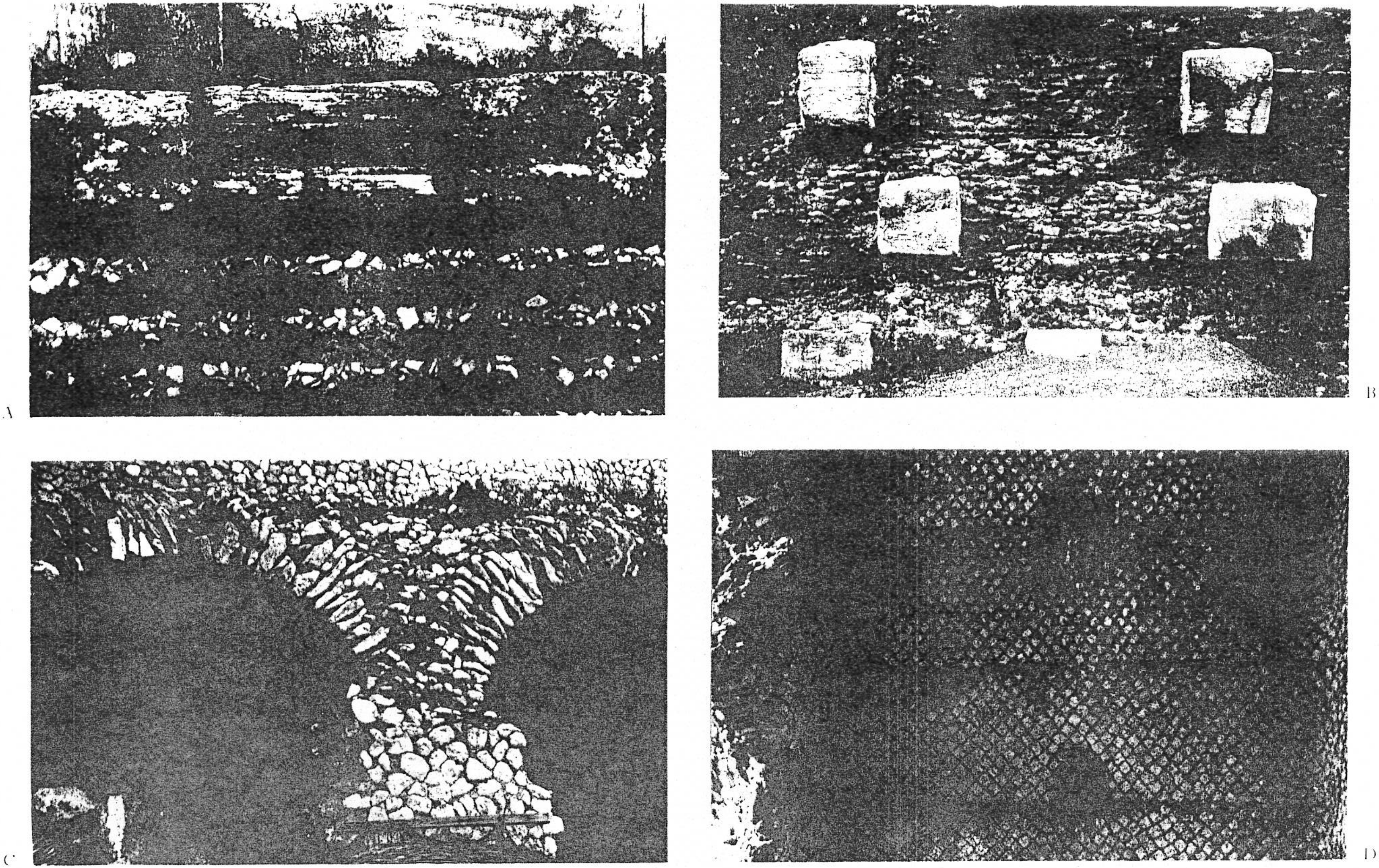
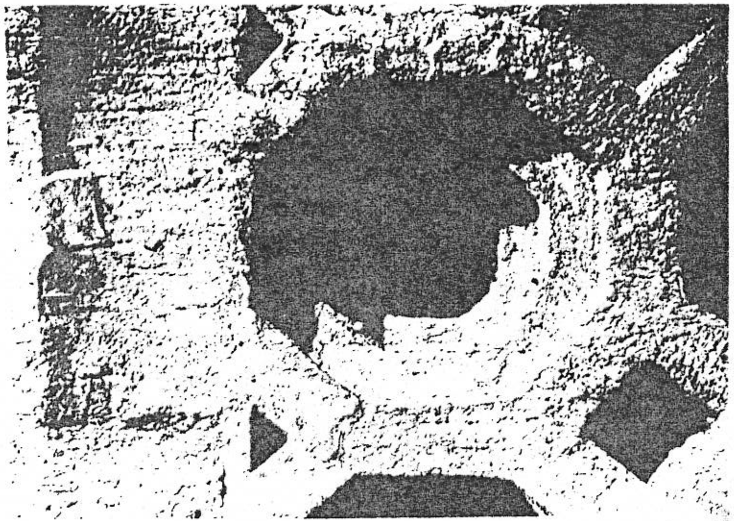


BUILDING TECHNIQUES IN ROMAN ITALY



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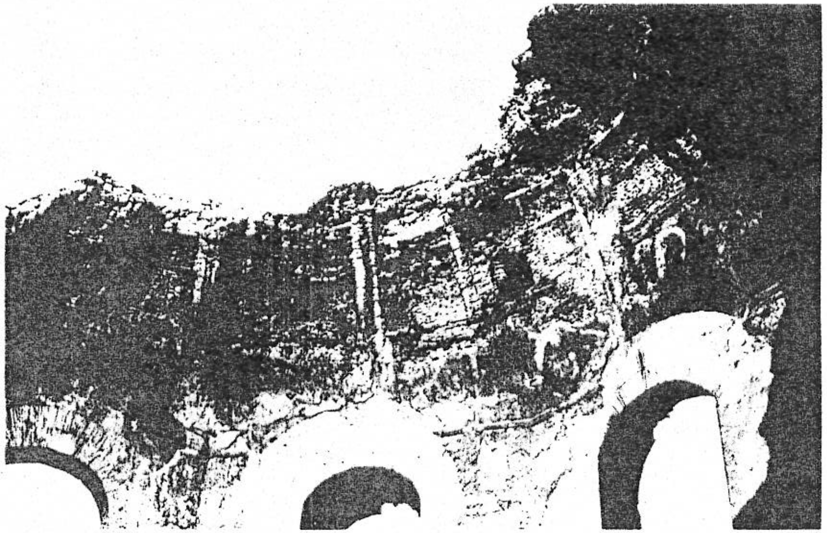

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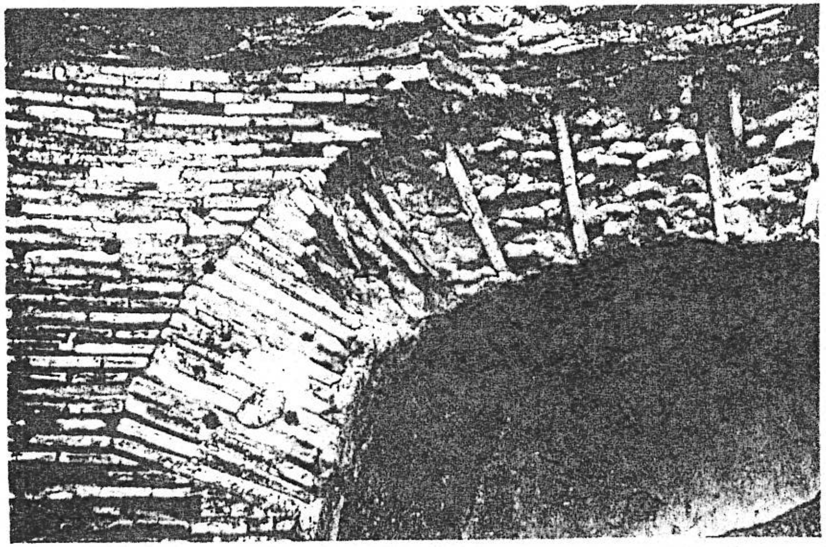

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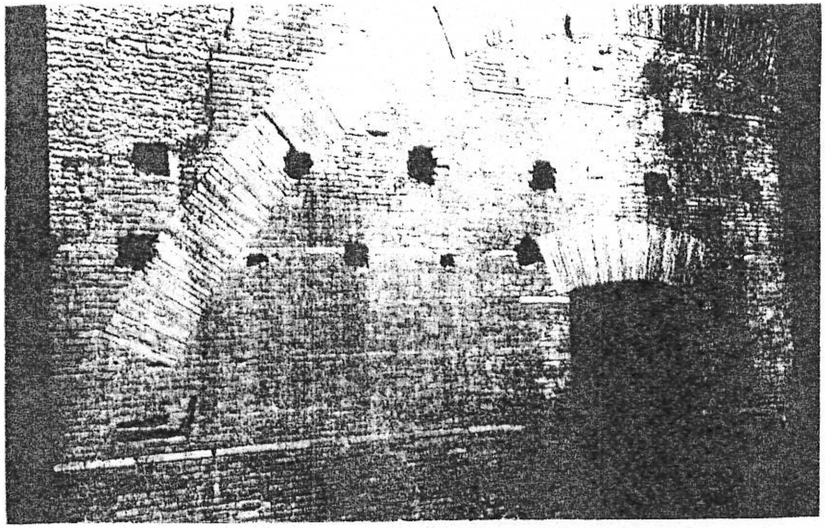


D

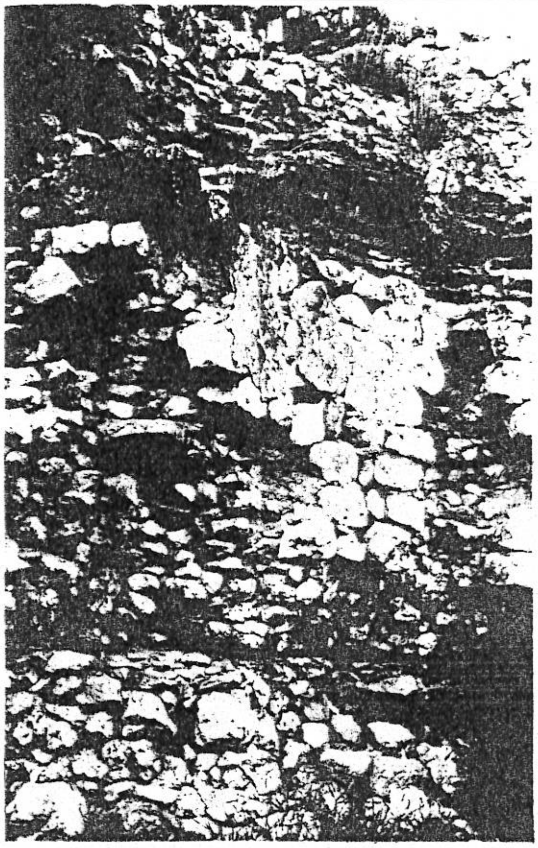
BUILDING TECHNIQUES IN ROMAN ITALY

A. Rome, vaulting of the Basilica of Maxentius, with impressions of planking. *c.* A.D. 310.

C. Rome, Villa of the Gordians: face of brick semi-dome. Mid 3rd century.

D. Rome, substructures of the Palatine: brick 'relieving arch'. Late 1st

24



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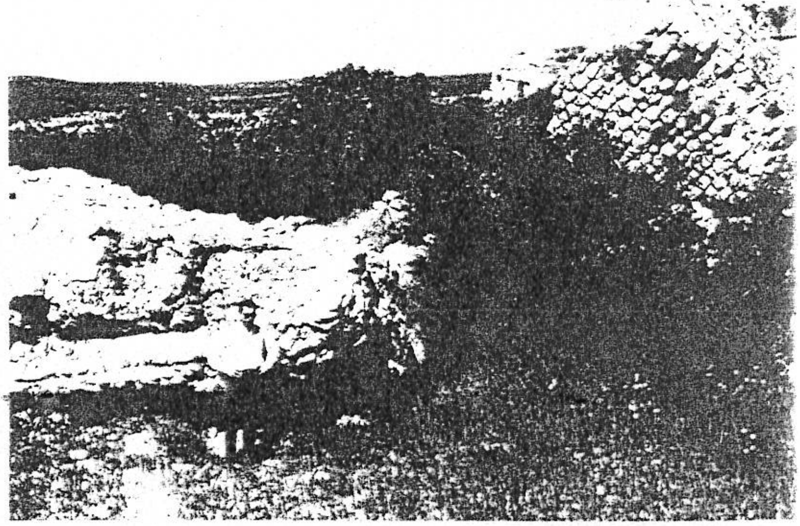

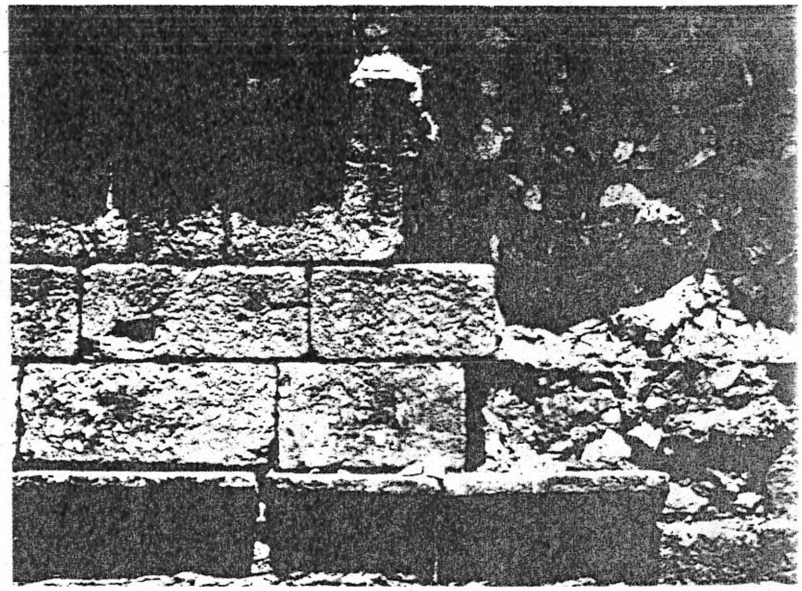

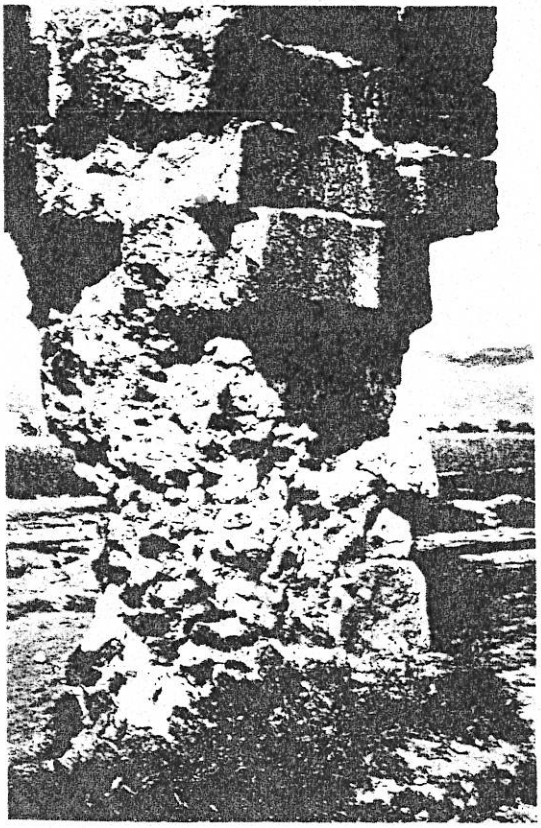

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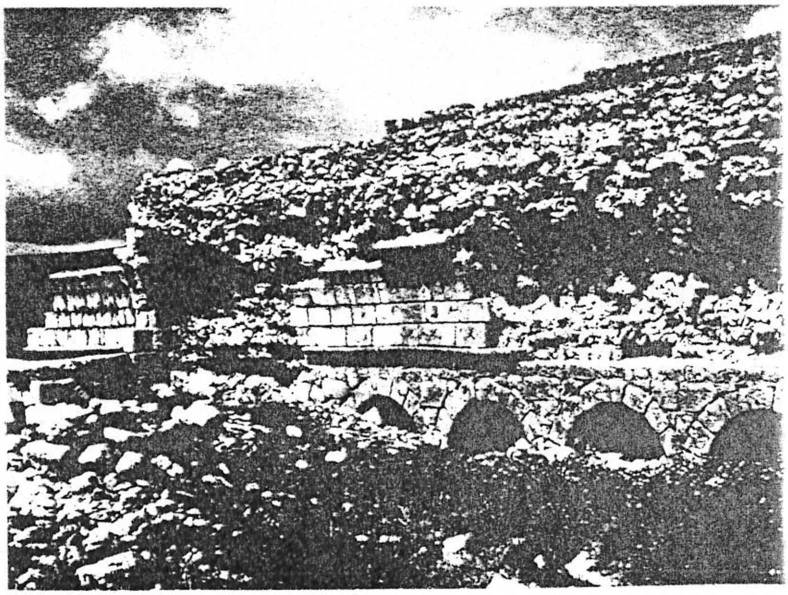
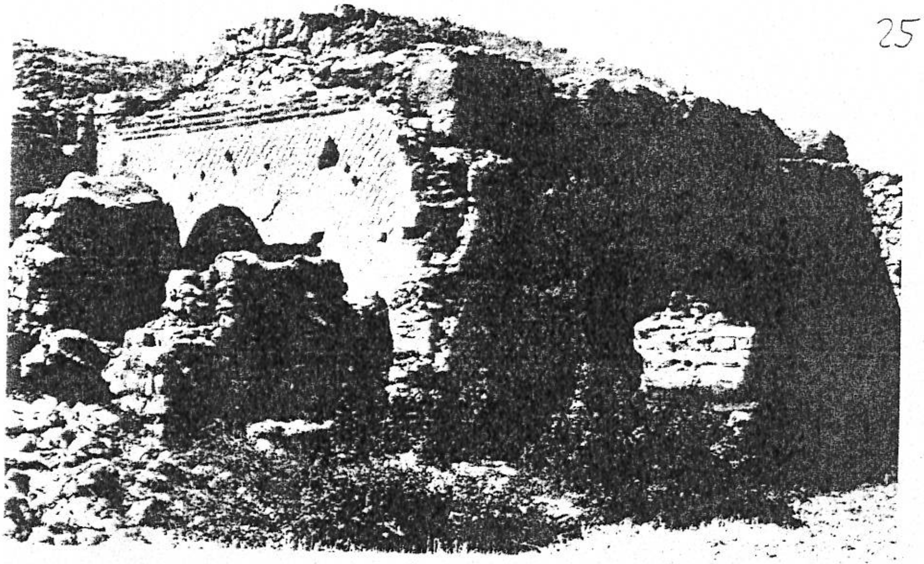


BUILDING TECHNIQUES IN ROMAN CILICIA

A, B. Korykos, bath building; note spring of brick semi-dome.

C. Erzin (Epiphaneia?), the aqueduct.

D, E. AkKale, the castle. Probably post-classical.



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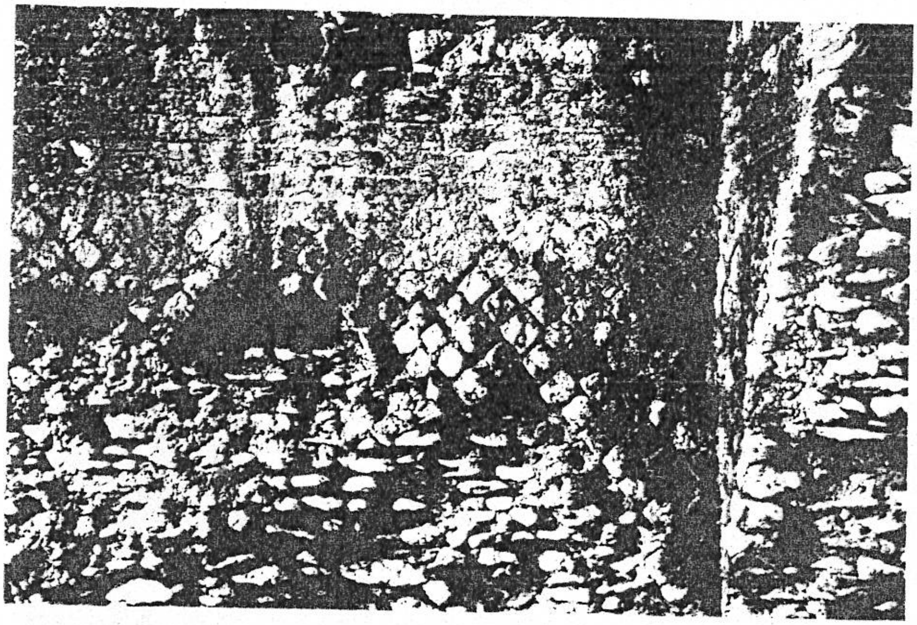

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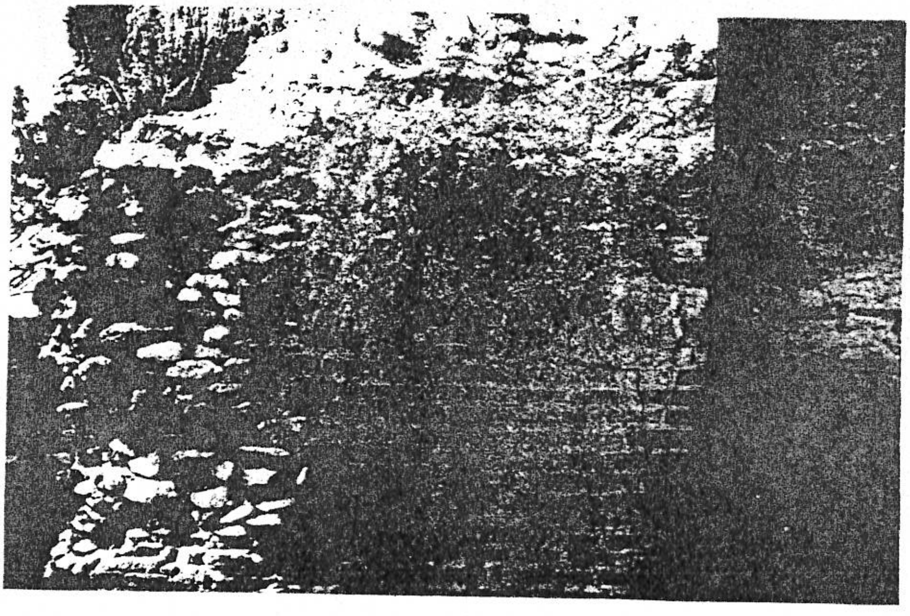

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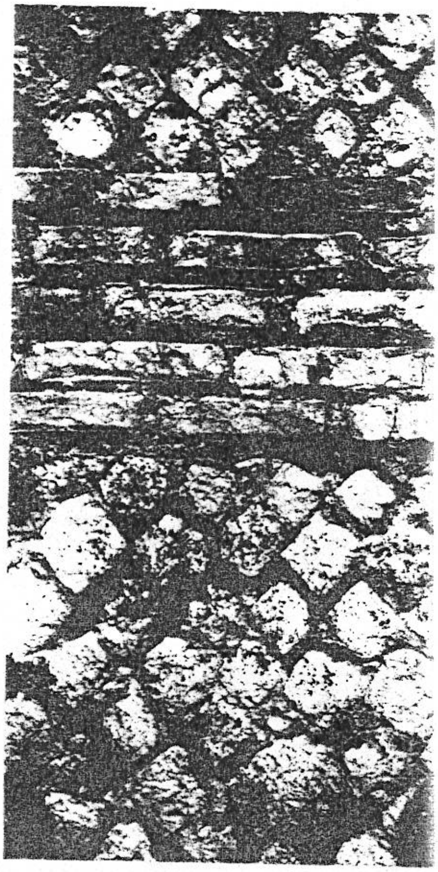
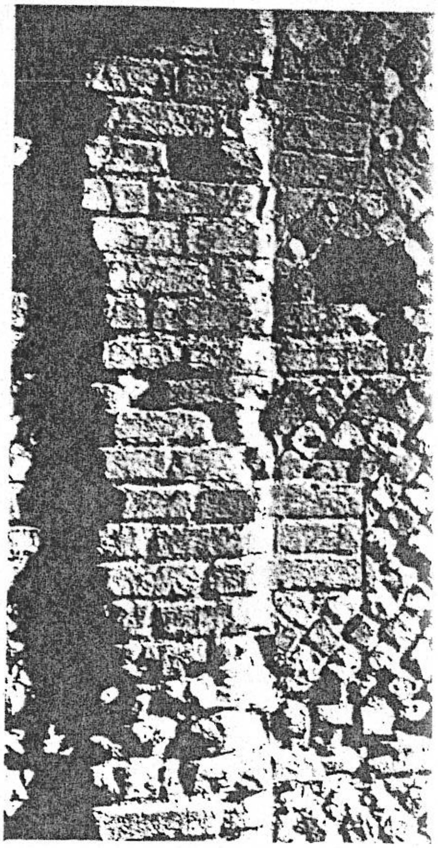
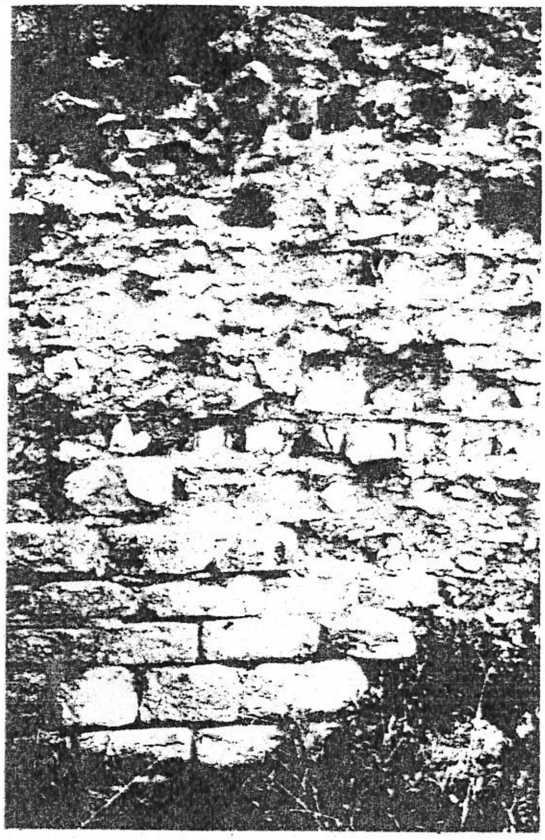




BUILDING TECHNIQUES IN ROMAN

A–D. Elaeusa-Sebaste, 'Reticulate Bath

E. Chieti, Italy. Combined brick-wo
reticulate in local stone (*opus mixt*



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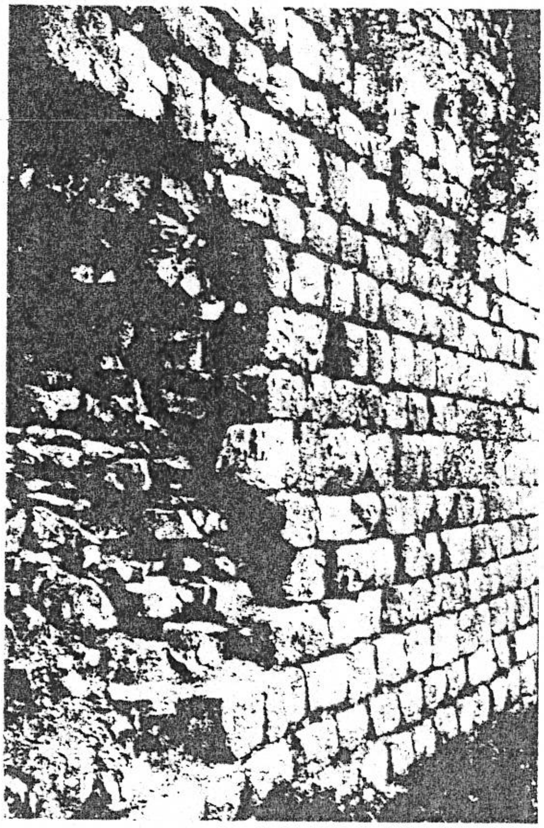
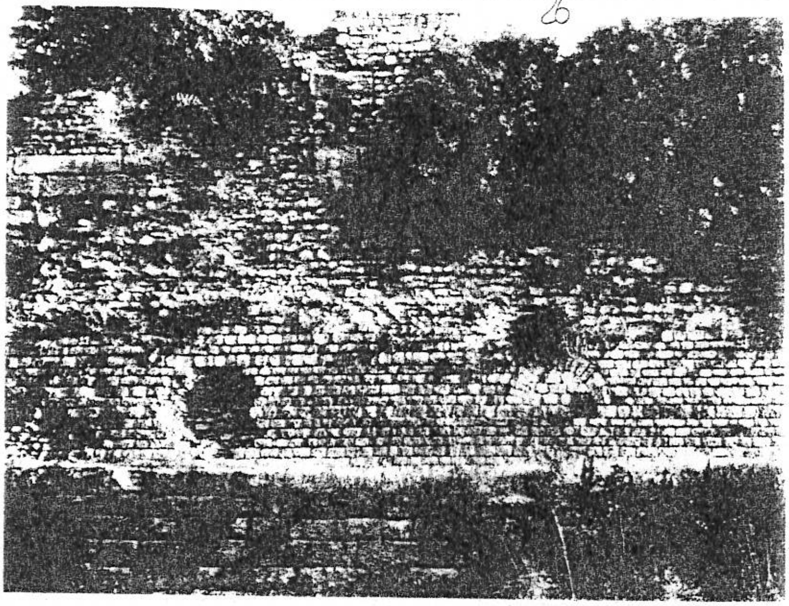


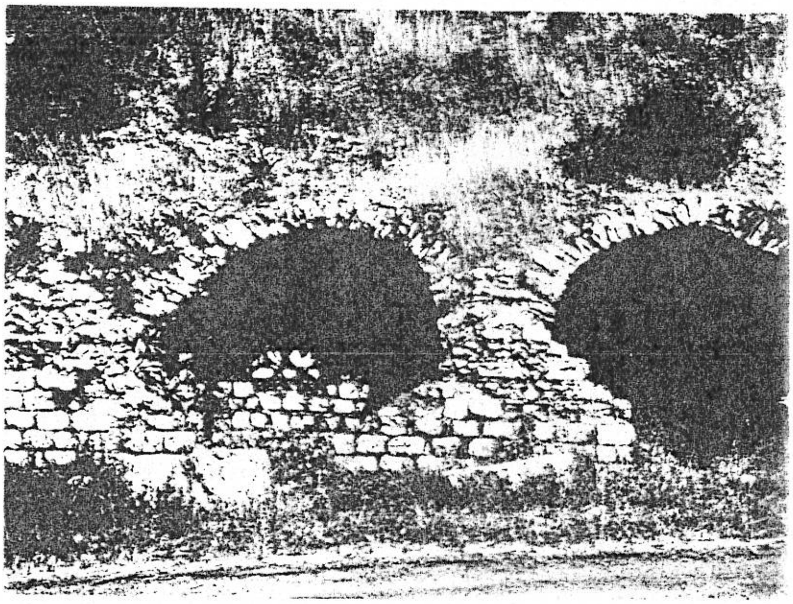
B

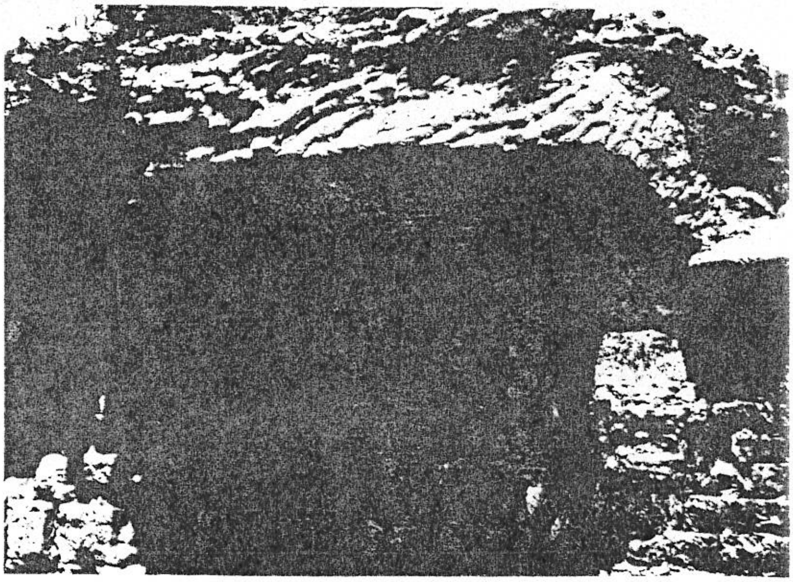
ROMAN BUILDING TECHNIQUES

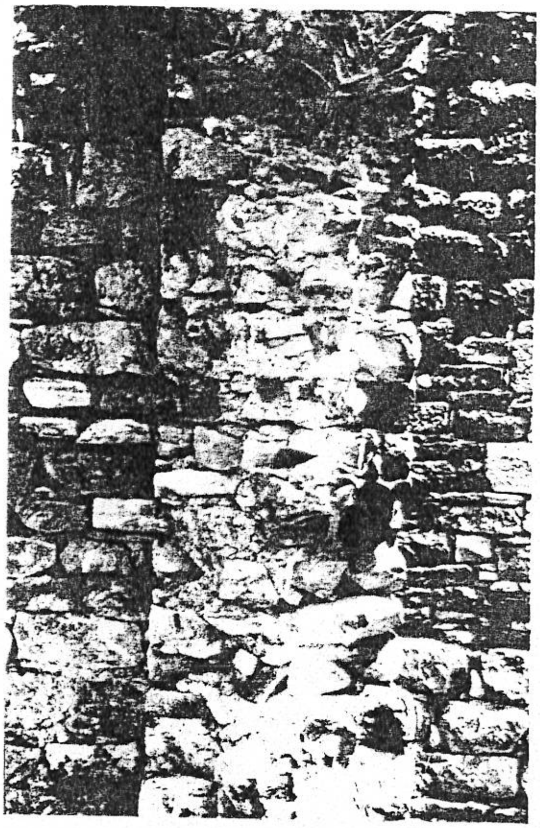
A–D. Ephesus, Baths of Vedius: A–C, the outer N. Wall; D, the tabernae of the W. street-frontage (Pl. 22c). Mid 2nd century.

E. Miletus, Baths of Faustina: brick vaulting. 3rd quarter of 2nd century.





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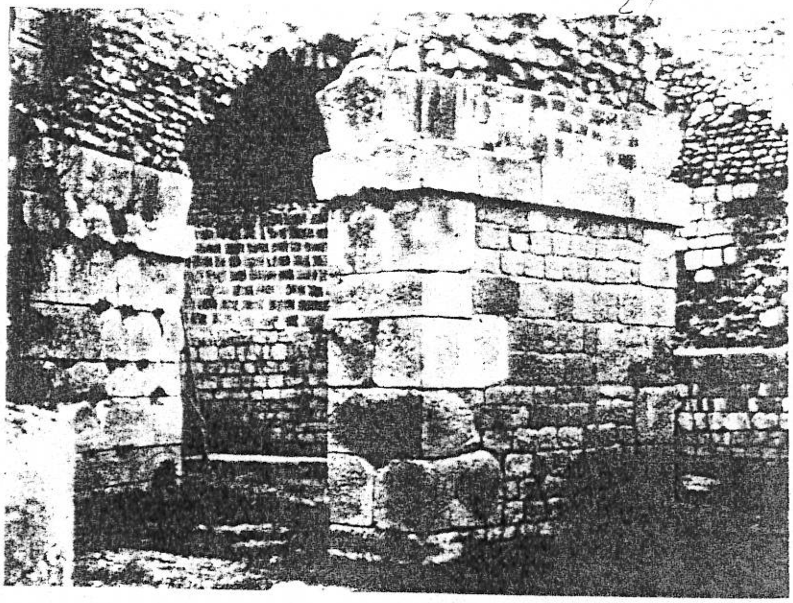

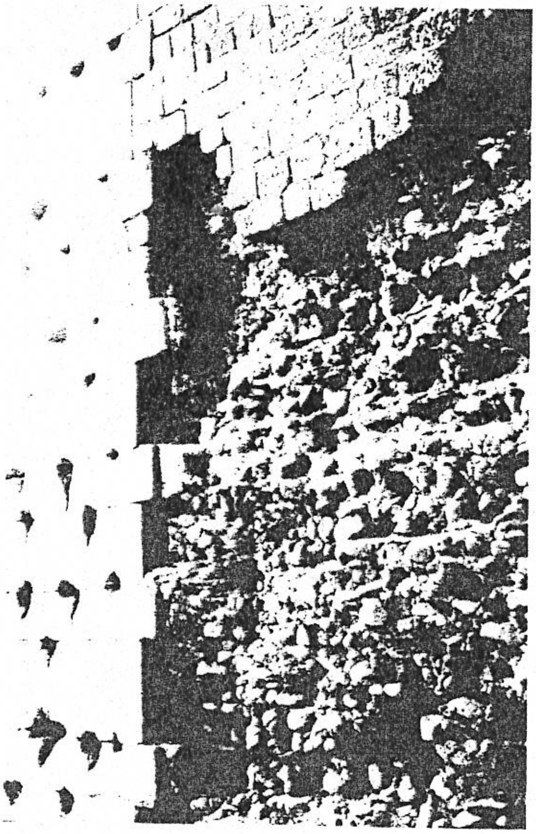
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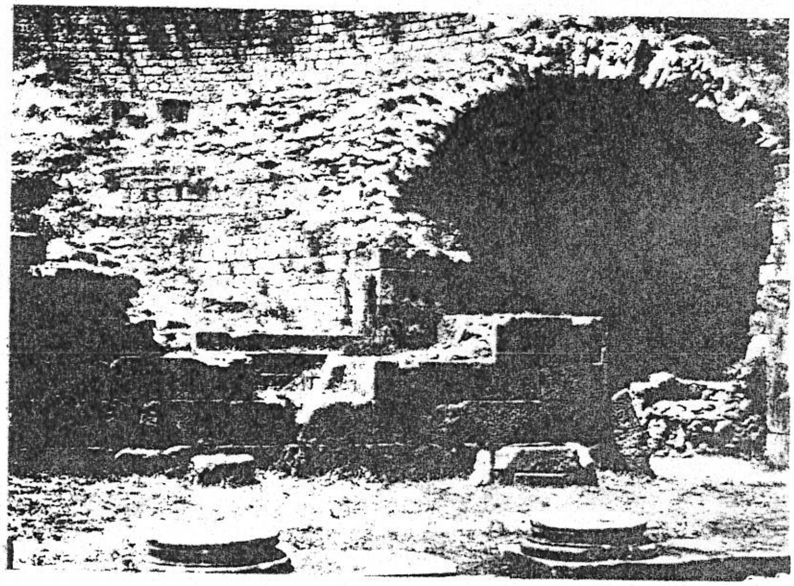
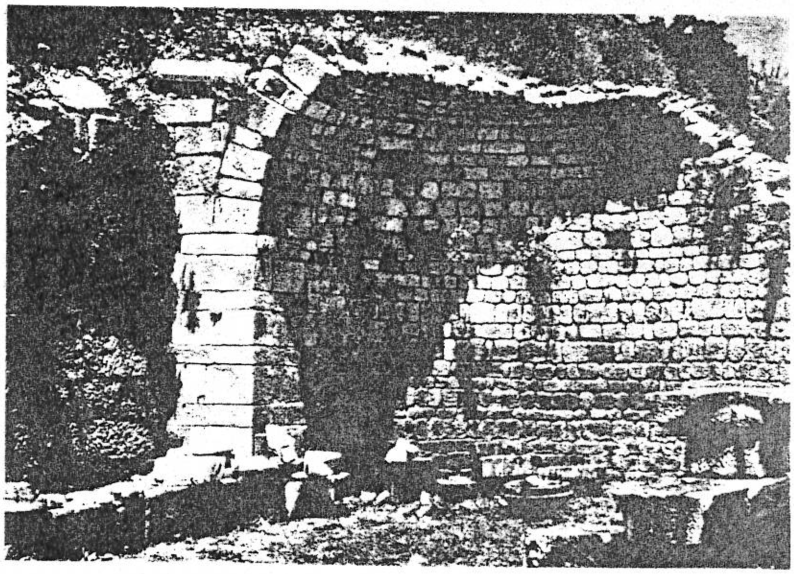
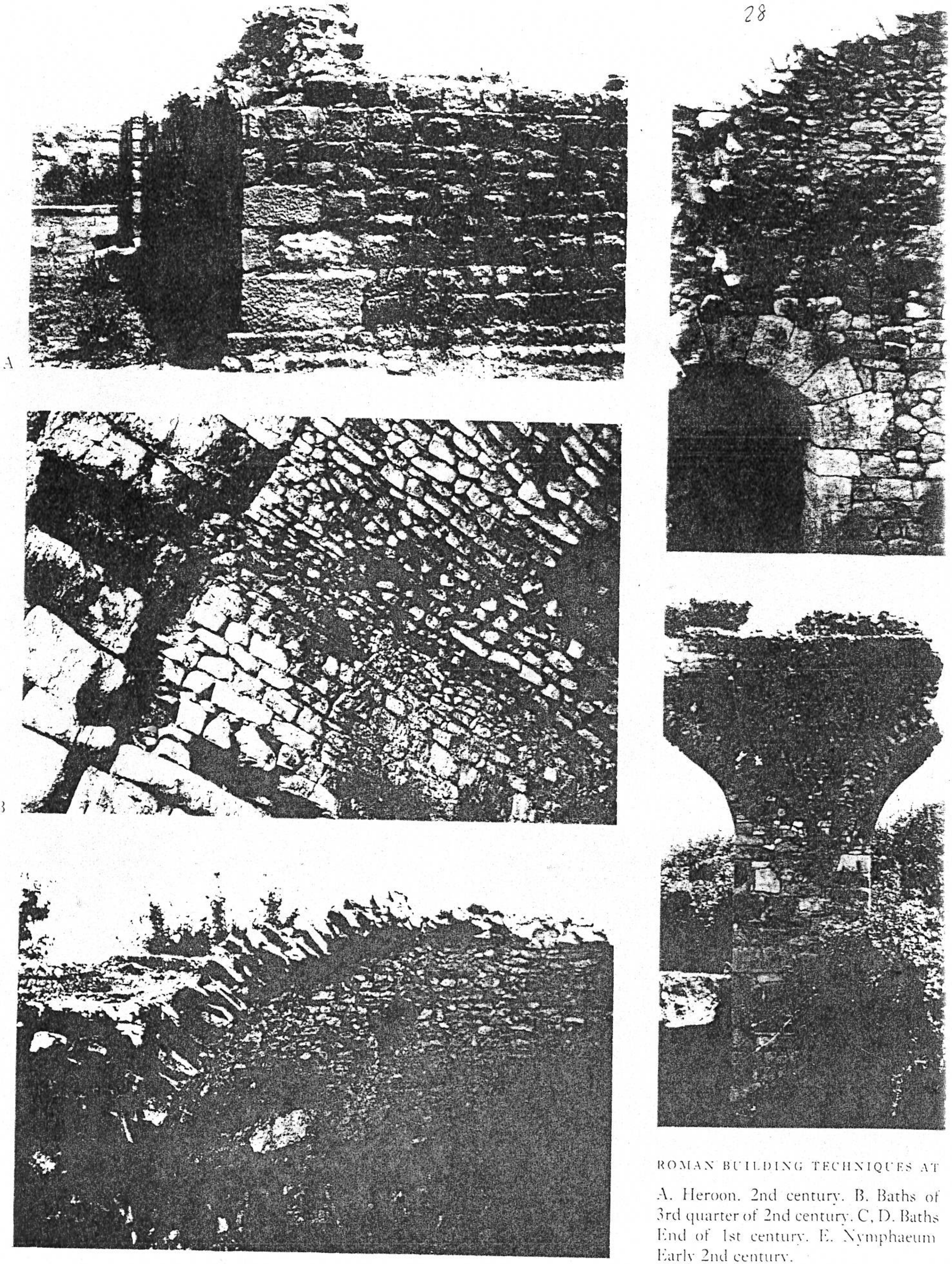




ROMAN BUILDING TECHNIQUES

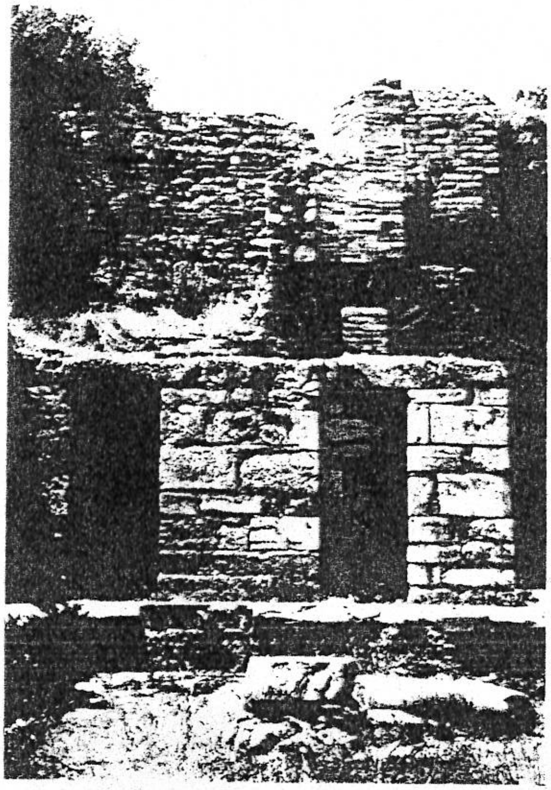
A. Miletus, Humeitepe Baths. *c.* A.D. 100.
B. Pergamon, Amphitheatre. 2nd century.
C. Pergamon, Asklepieion. Mid 2nd century.
D, E. Pergamon, Gymnasium. 1st half of 2nd century.

28



ROMAN BUILDING TECHNIQUES AT

A. Heroon. 2nd century. B. Baths of 3rd quarter of 2nd century. C, D. Baths End of 1st century. E. Nymphaeum Early 2nd century.



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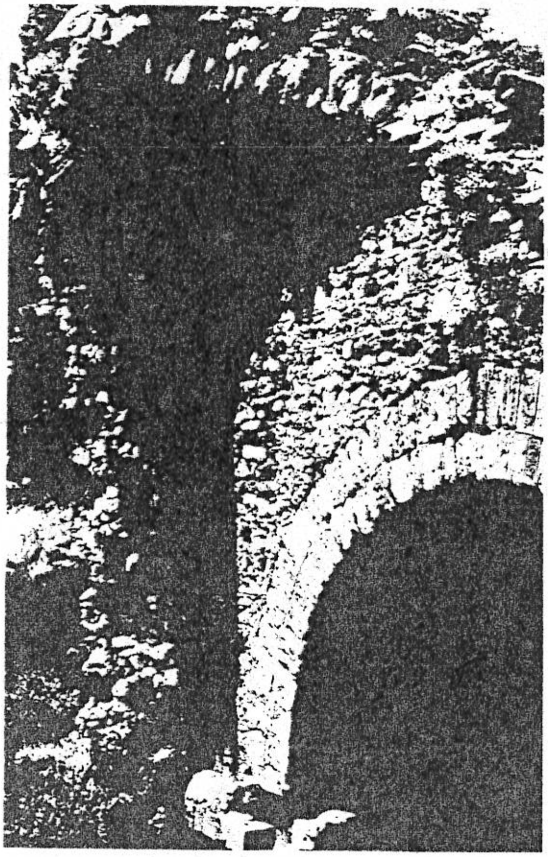

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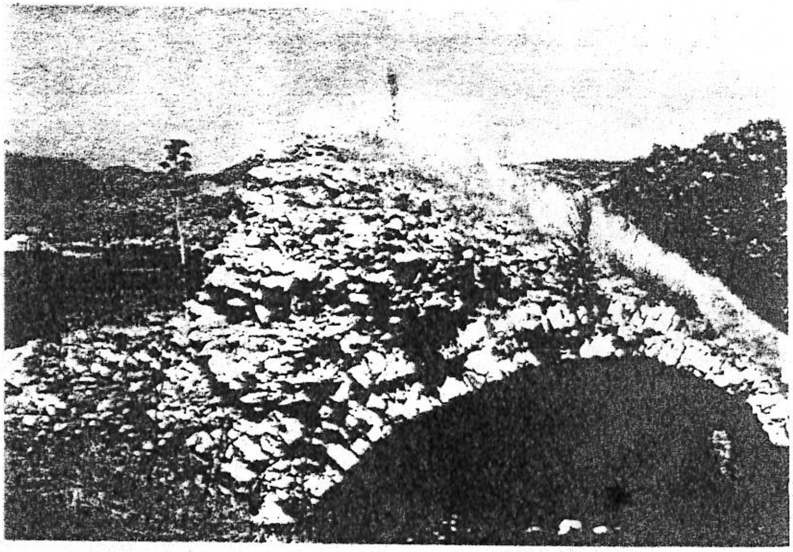
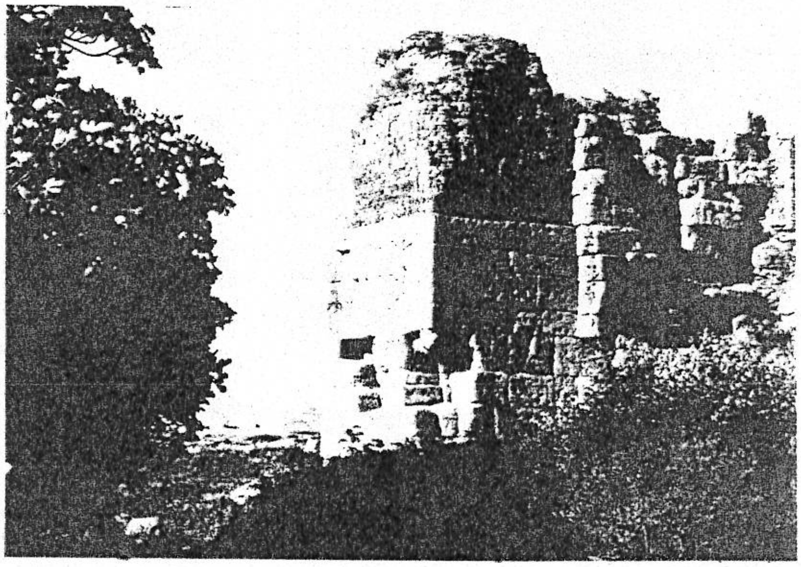
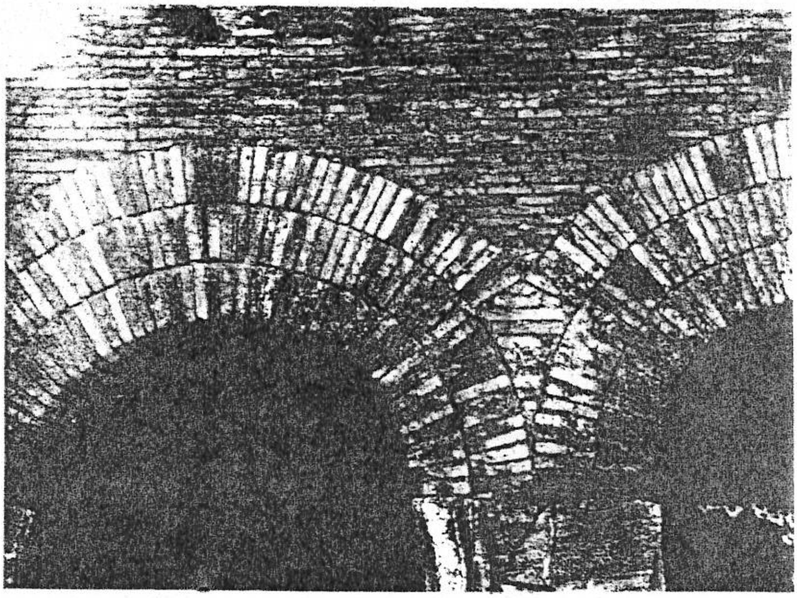
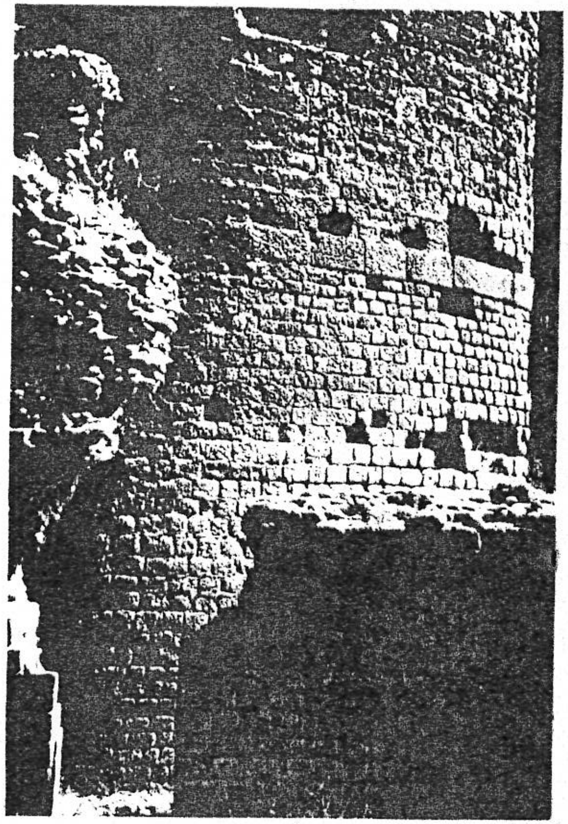






ROMAN BUILDING TECHNIQUES AT EPHESUS

A. Library of Celsus, 2nd quarter of 2nd century. B, C. Stadium: B. 4th century additions; C. 1st century A.D. D, E. Harbour Baths: D, main *caldarium*, 2nd century; E. Atrium, 4th century.



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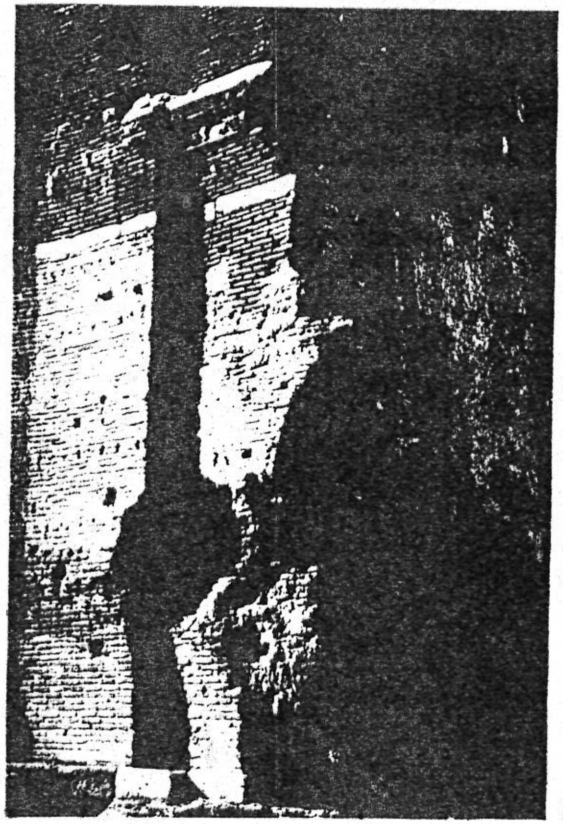

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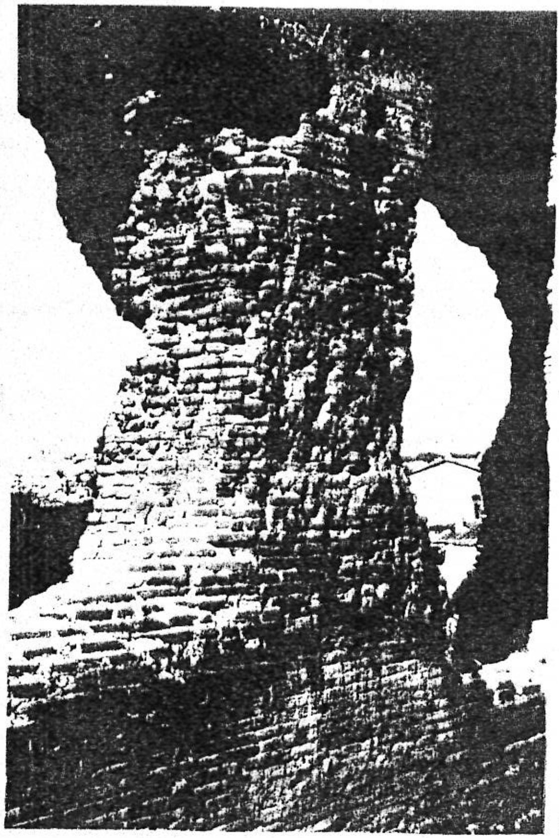

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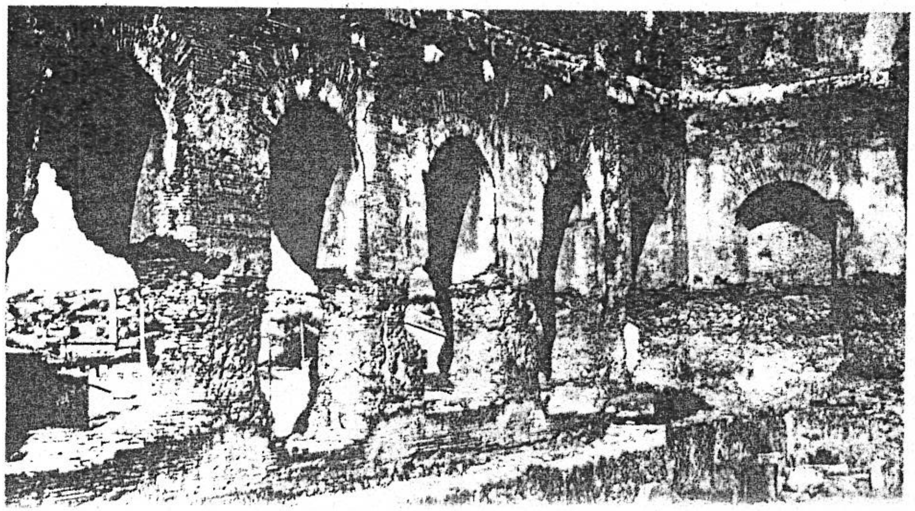

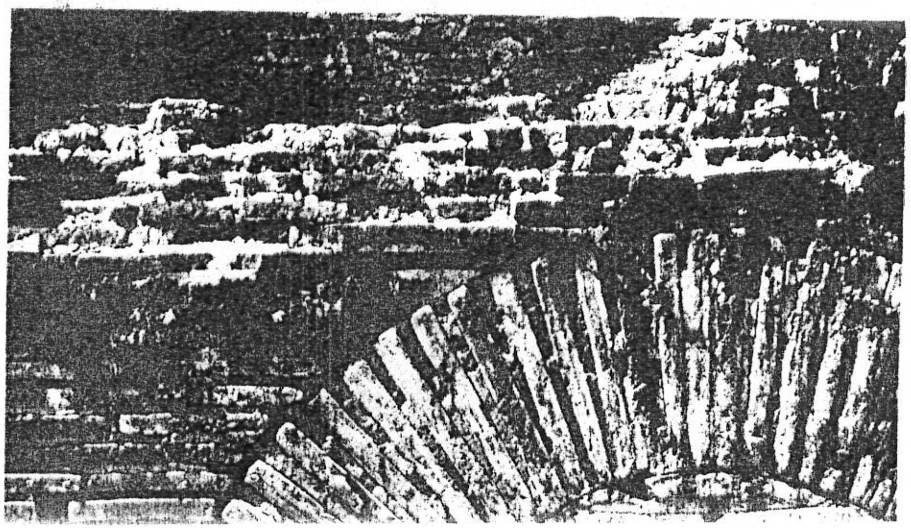

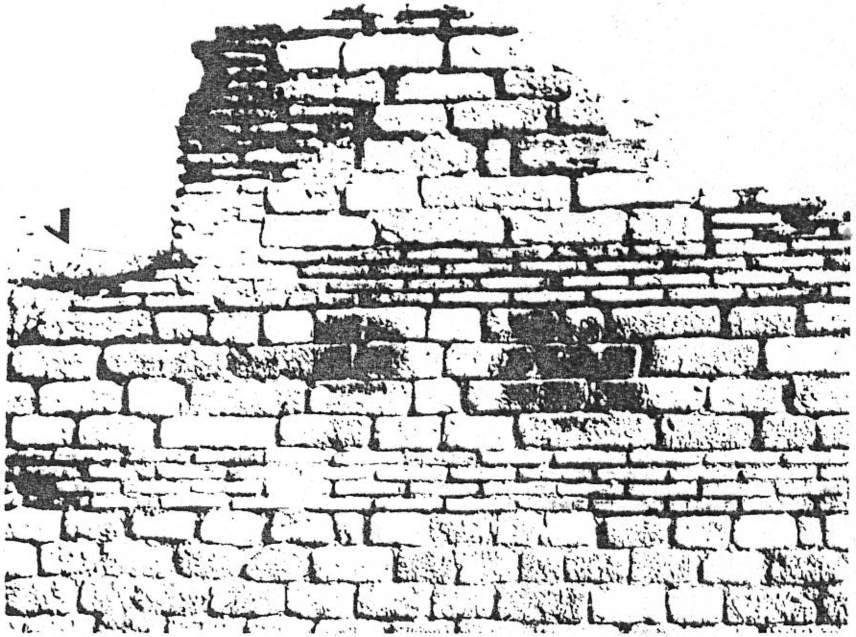
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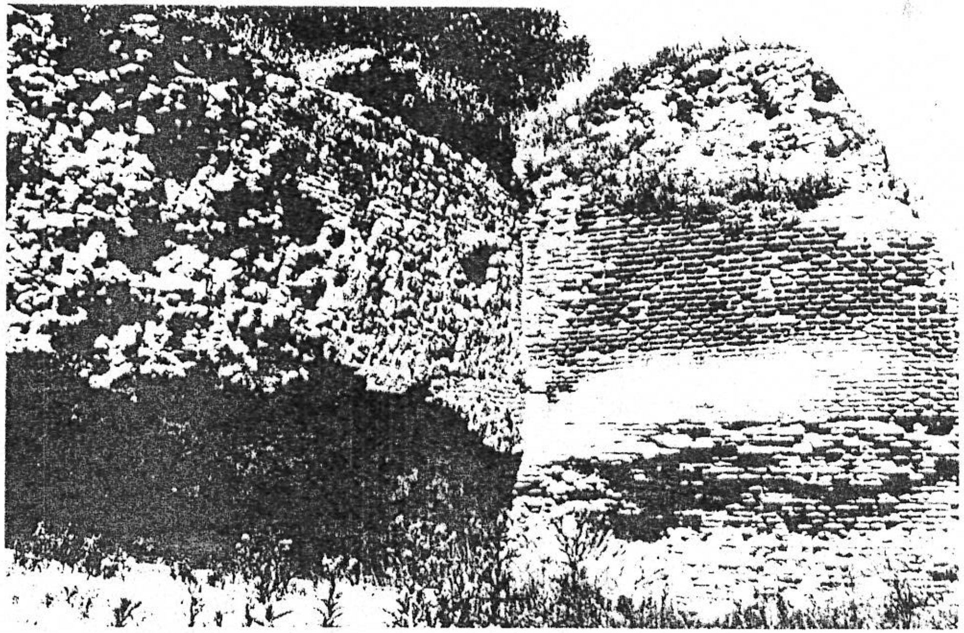
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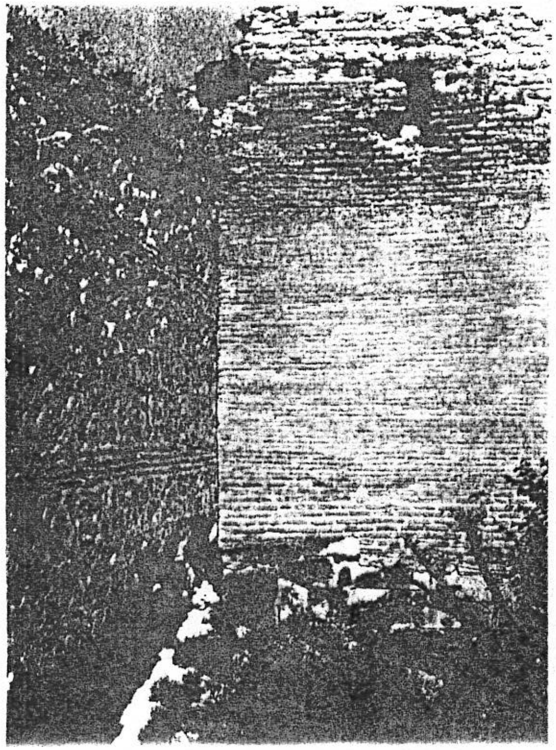

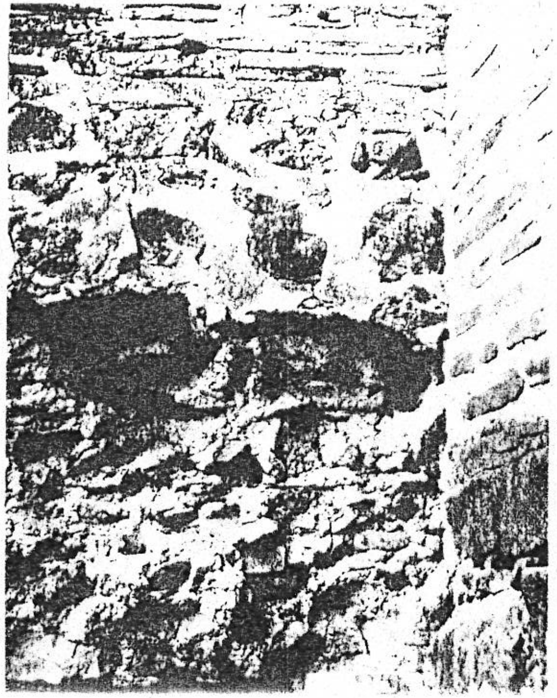

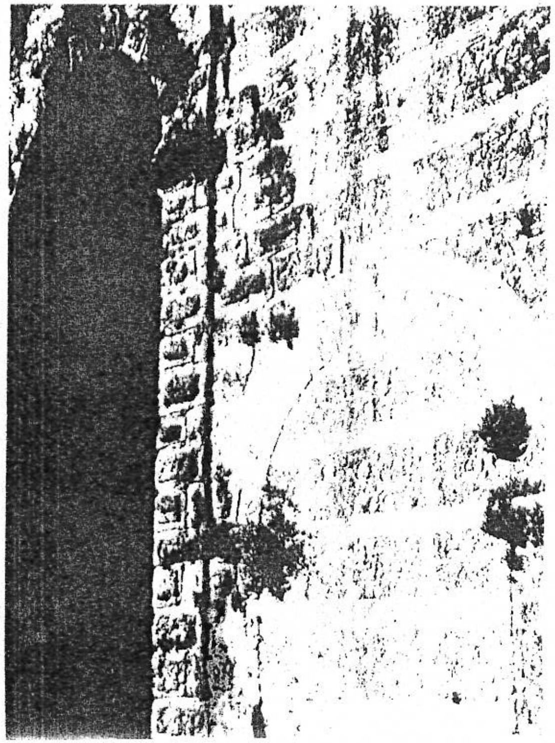

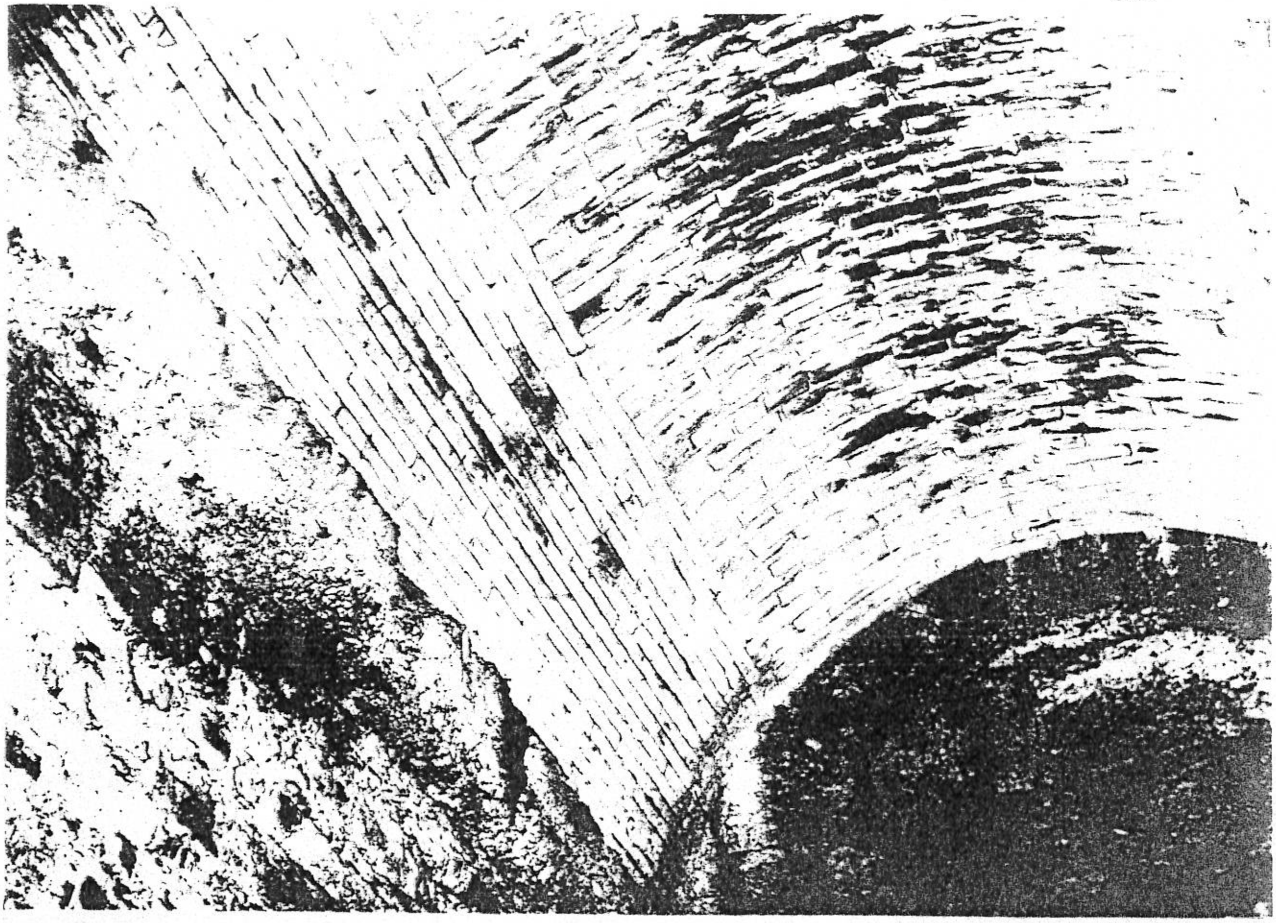

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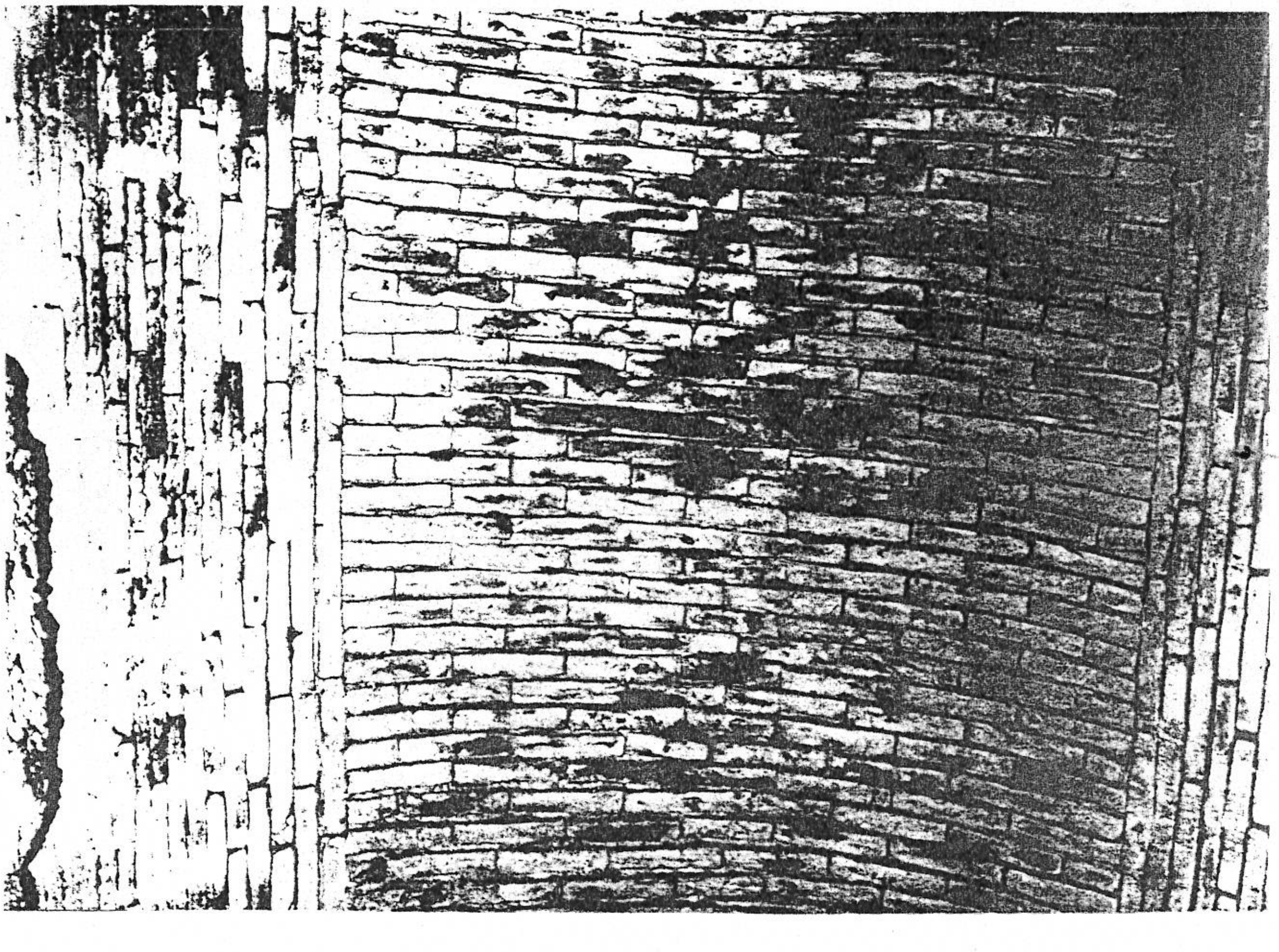
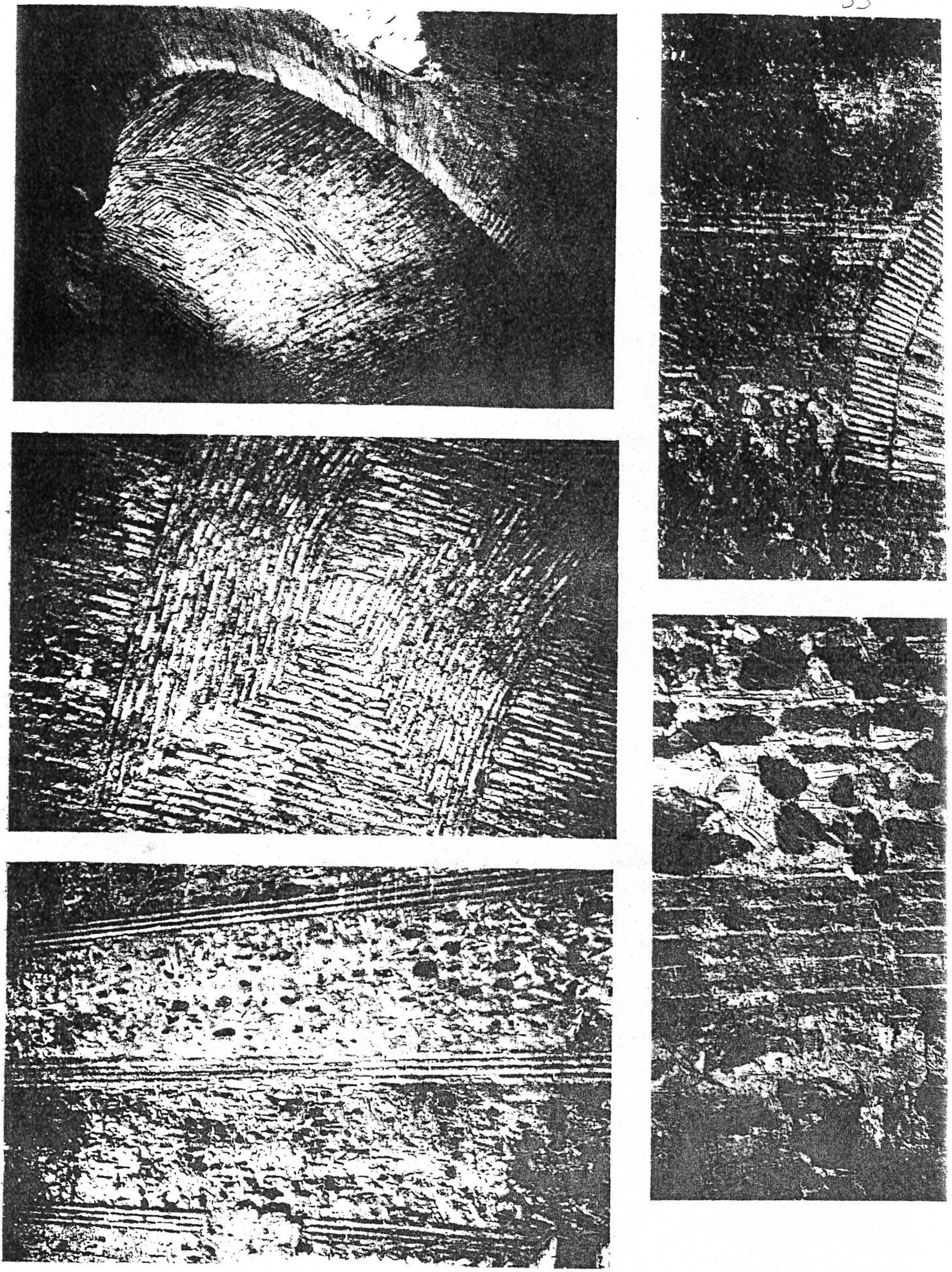


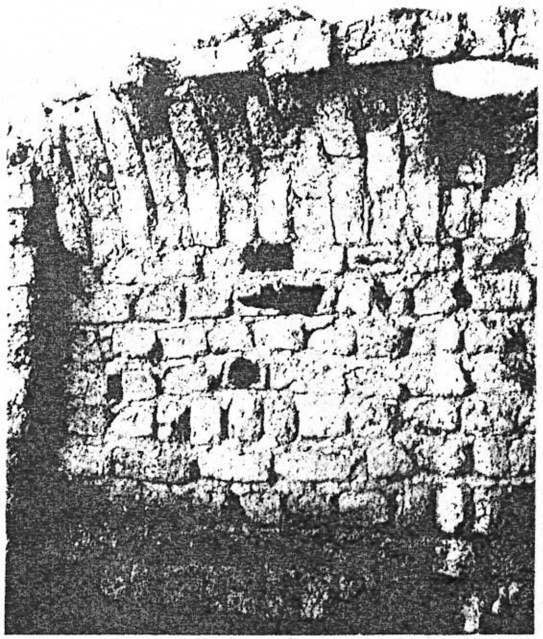
B

Pitched brick vaulting in the substructures of the Basilica at Aspendos. Second half of 3rd century.



SALONICA, ROMAN AND BYZANTINE BUILDING TECHNIQUES

A, B. Church of St. George *c.* A.D. 300. C. City walls, 5th century(?) D. Church of St. George, detail of exterior. E. Recently excavated octagonal building *c.* A.D. 300.



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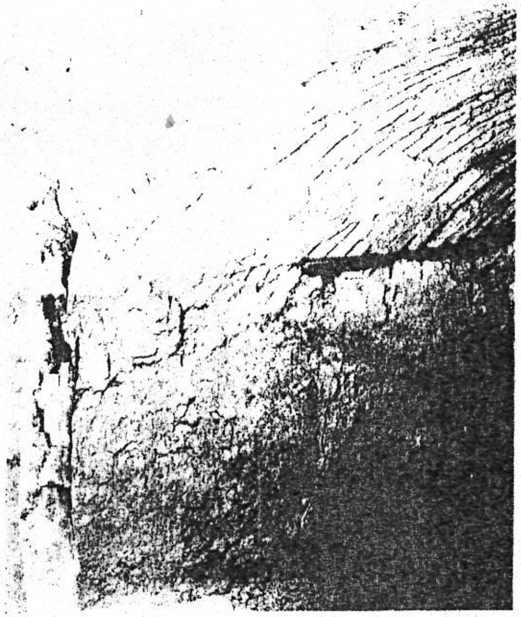

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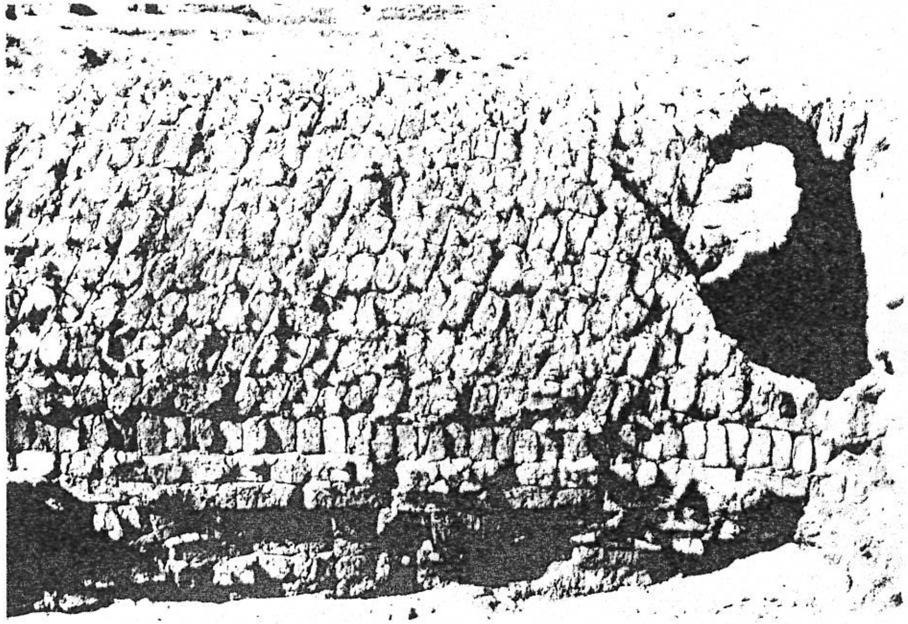
C



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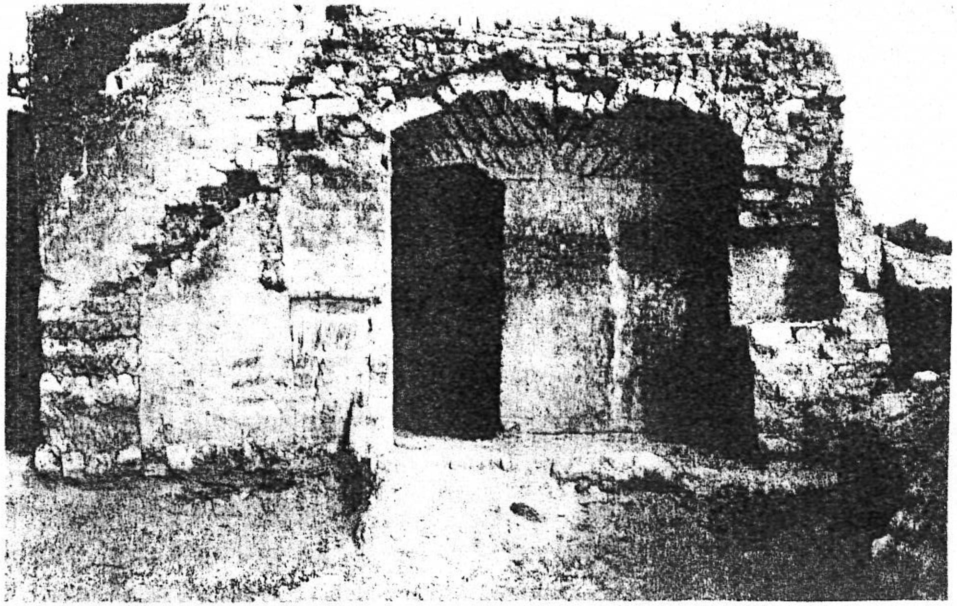

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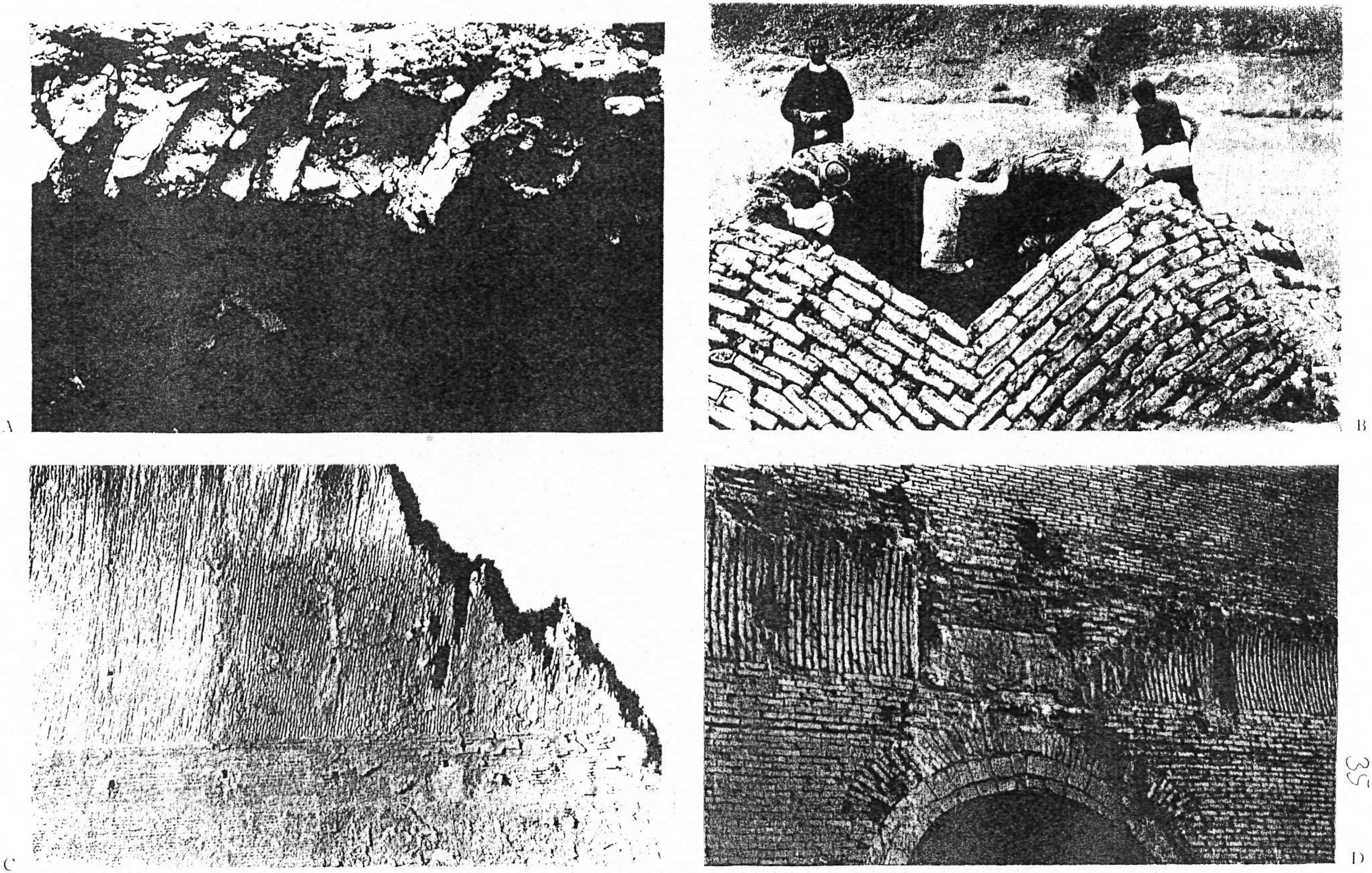
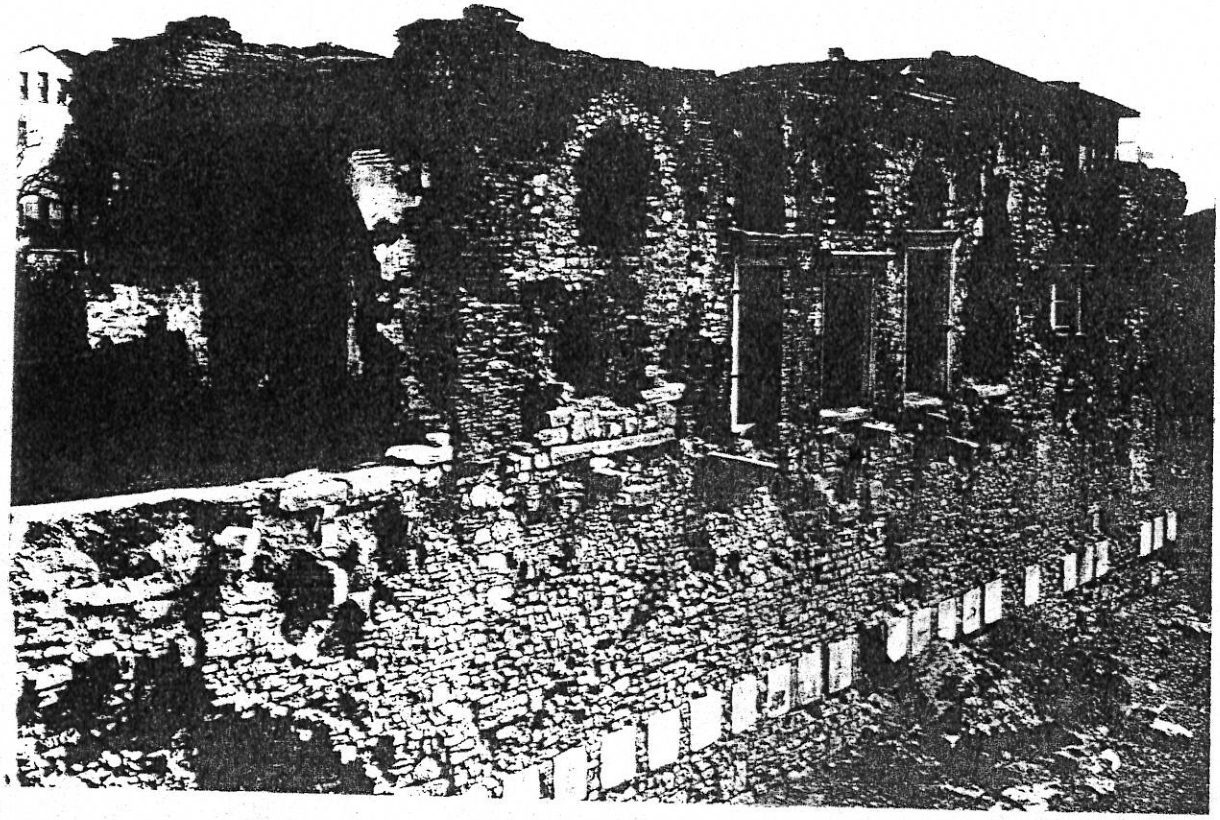


PITCHED BRICK VAULTING IN MESOPOTAMIA AND IRAN

35



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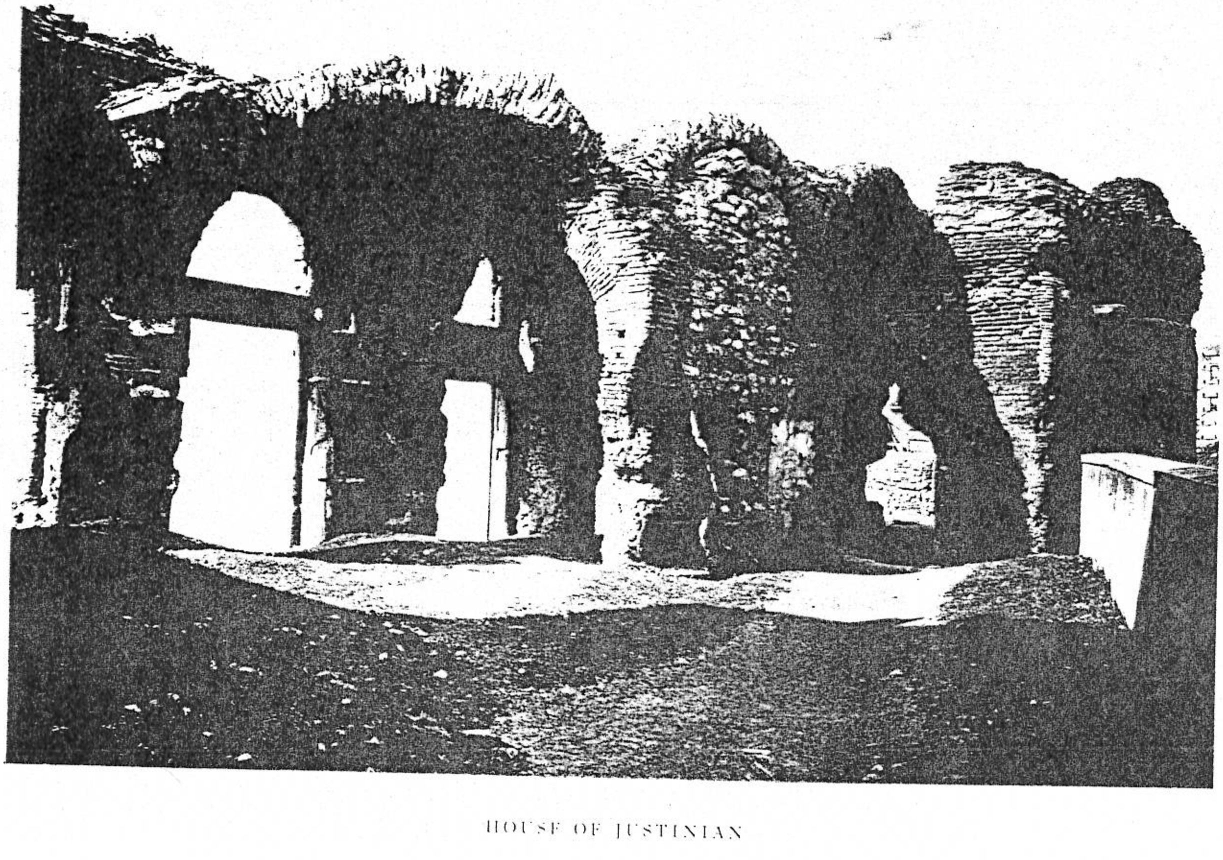
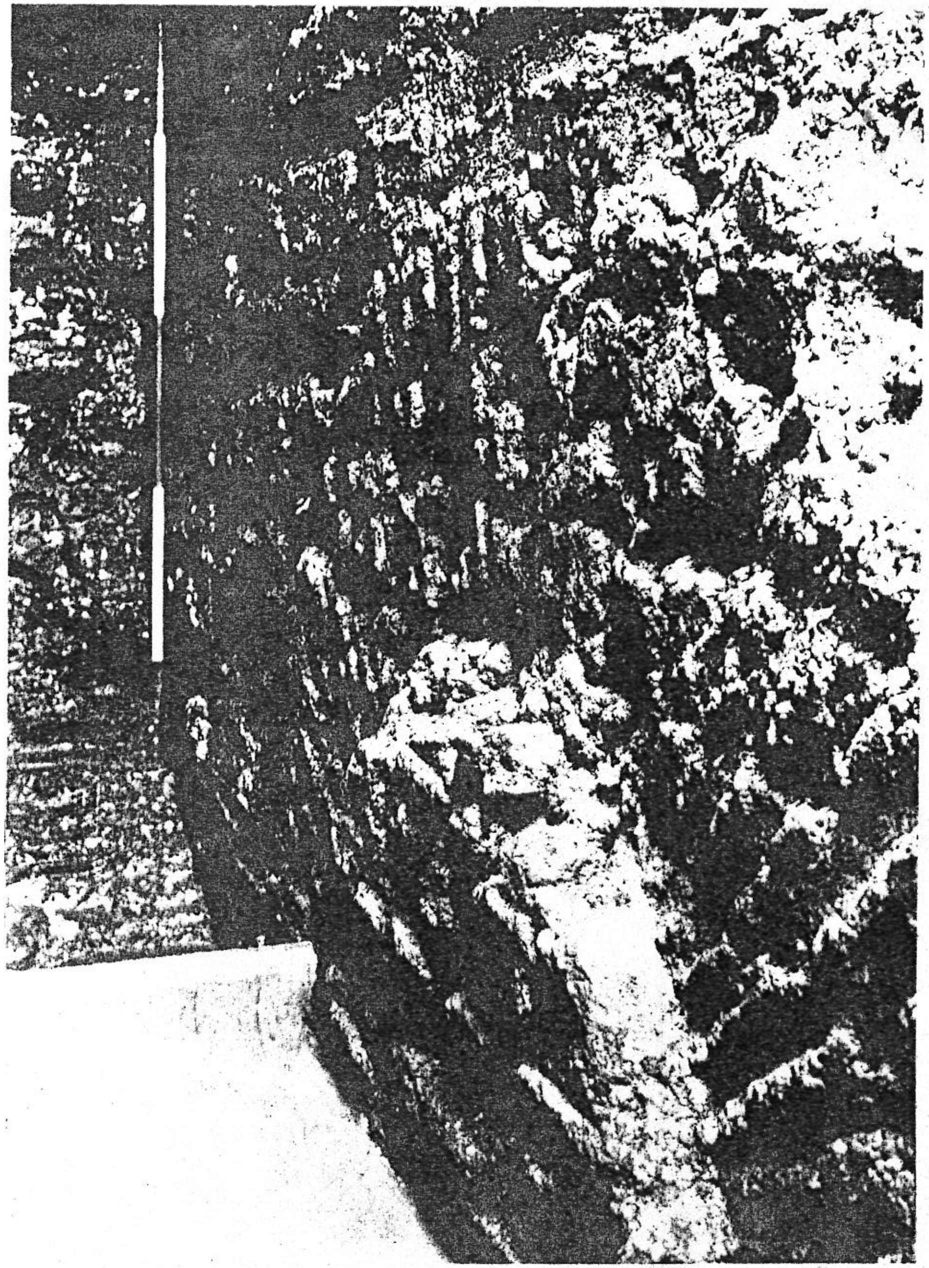


B

HOUSE OF JUSTINIAN

A. The second sea-wall and the loggia above. B. The loggia looking towards the sea.



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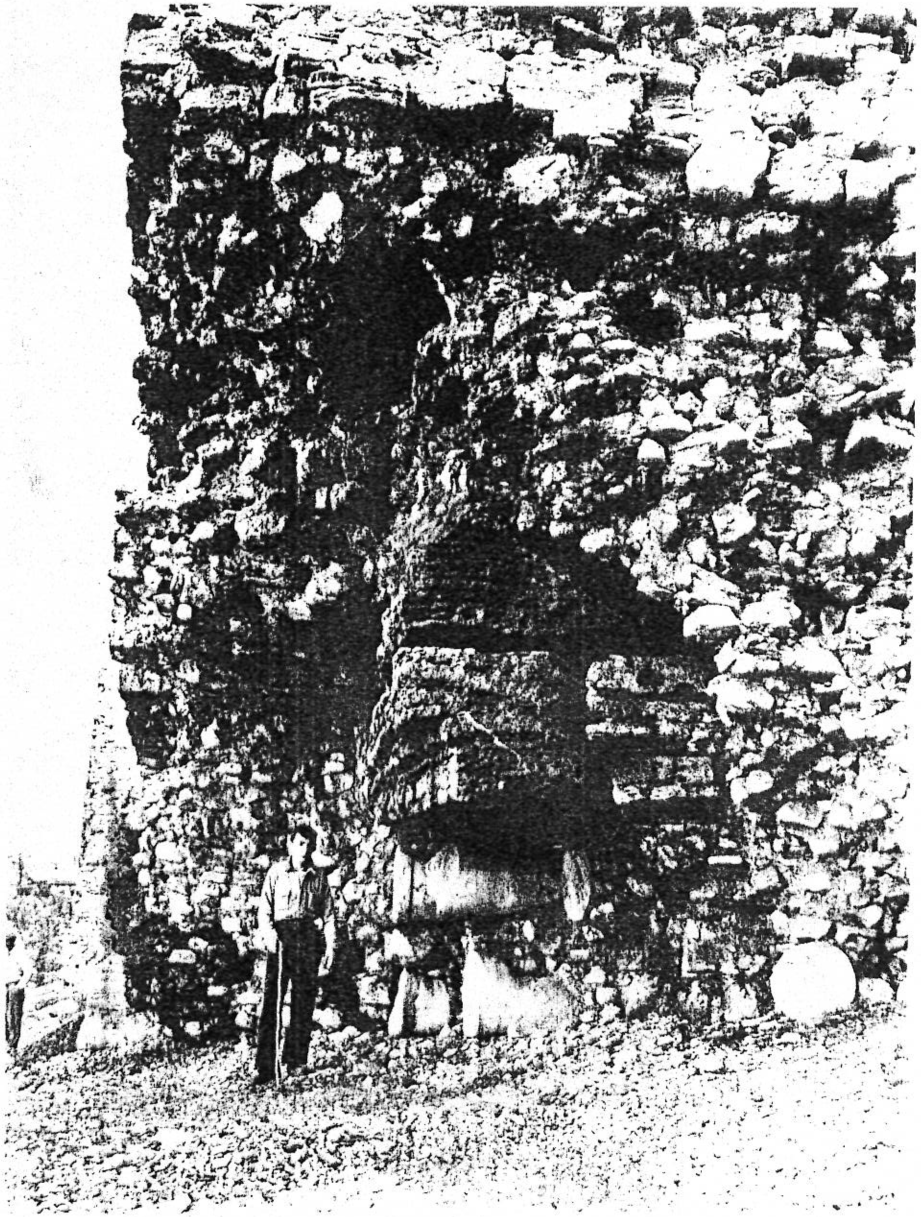

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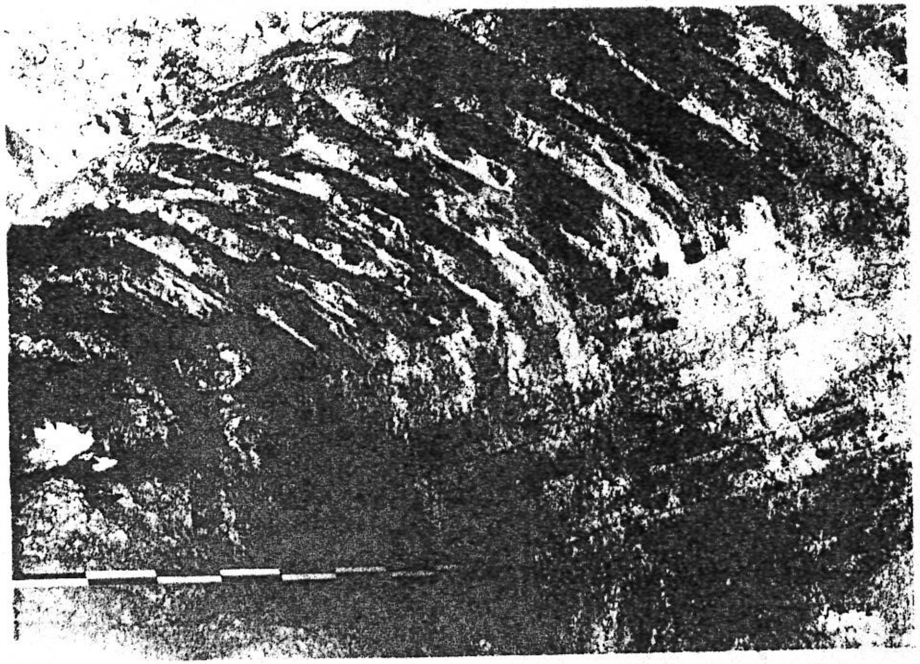

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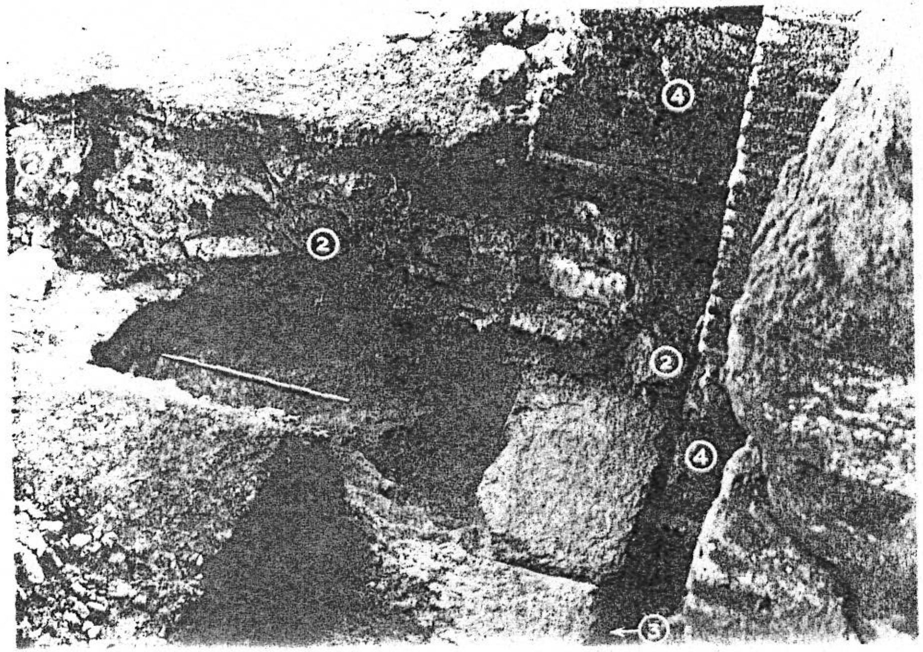

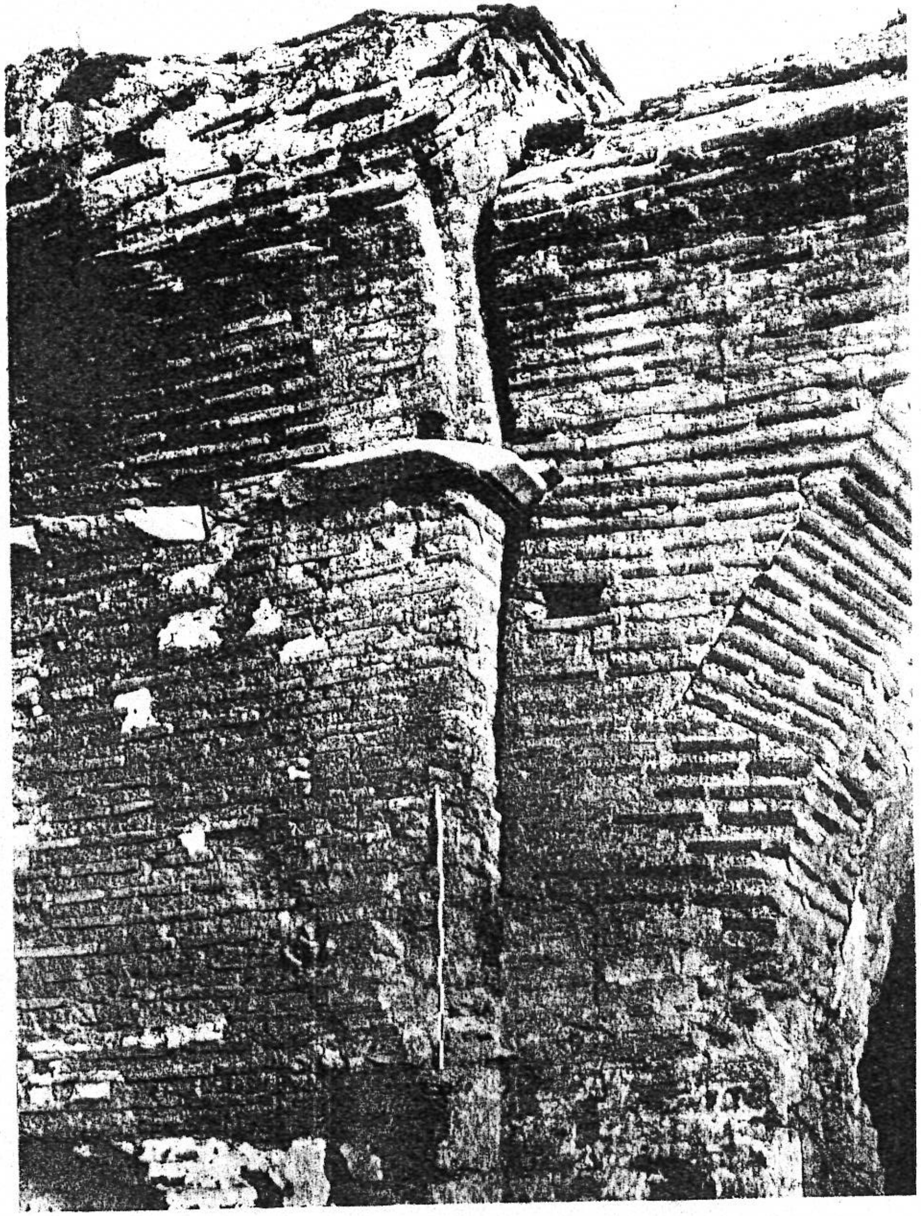

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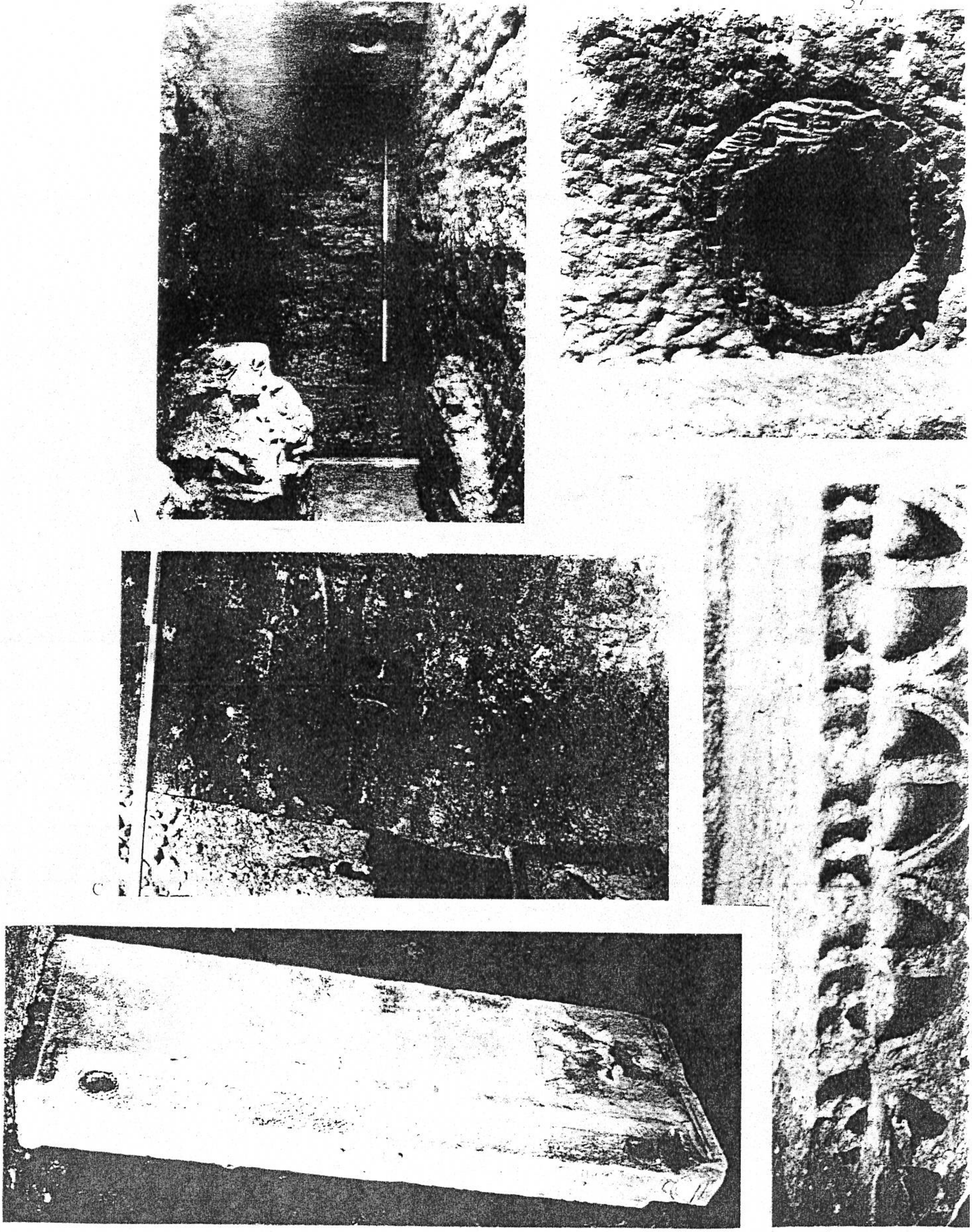
C

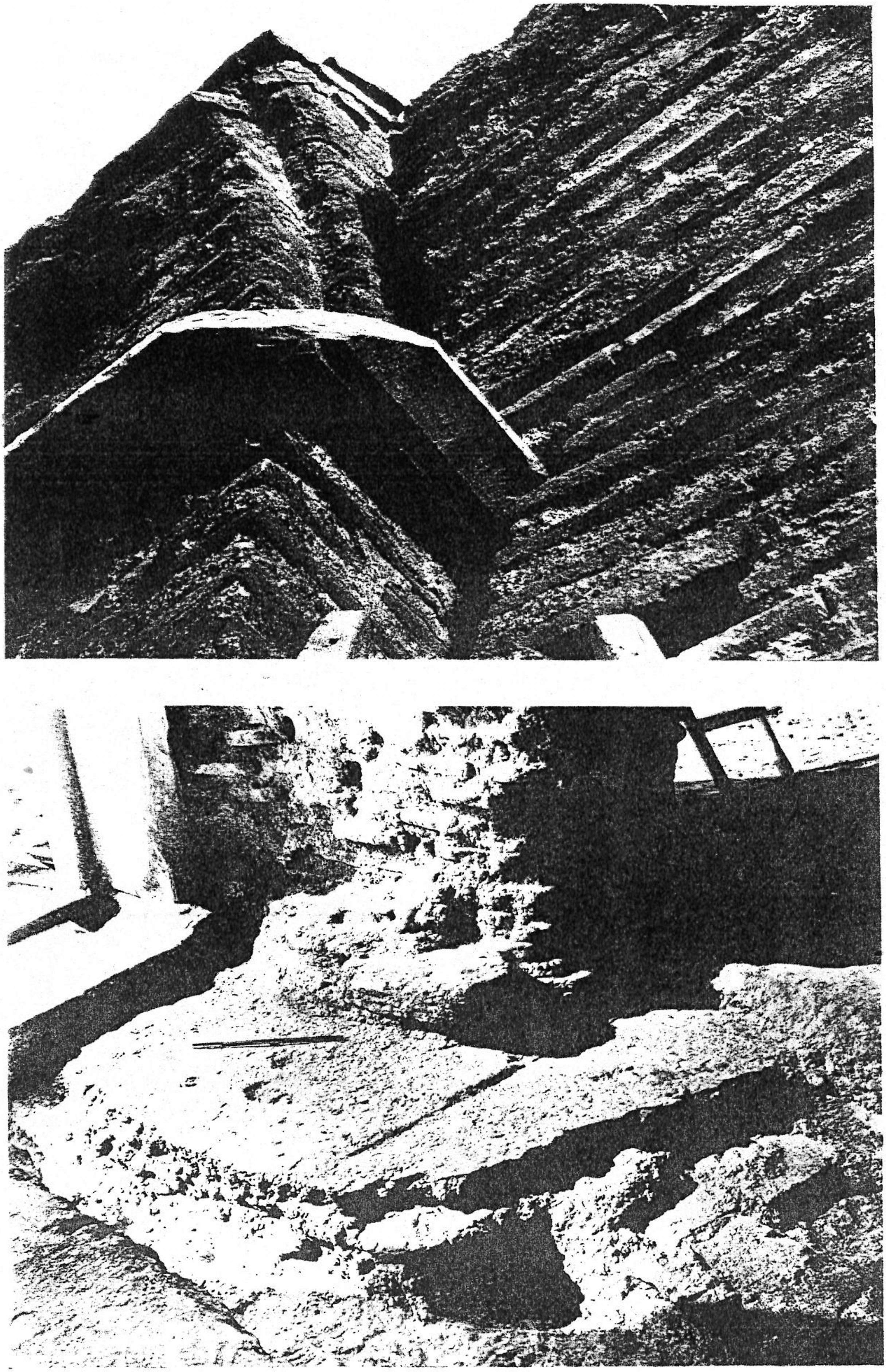
HOUSE OF JUSTINIAN

A. Vault of the corridor in the original sea-wall. B. Details of sea-wall: (1) Crenellation at the top of the 1st sea-wall. (2) Core of the 2nd sea-wall. (3) Large stone



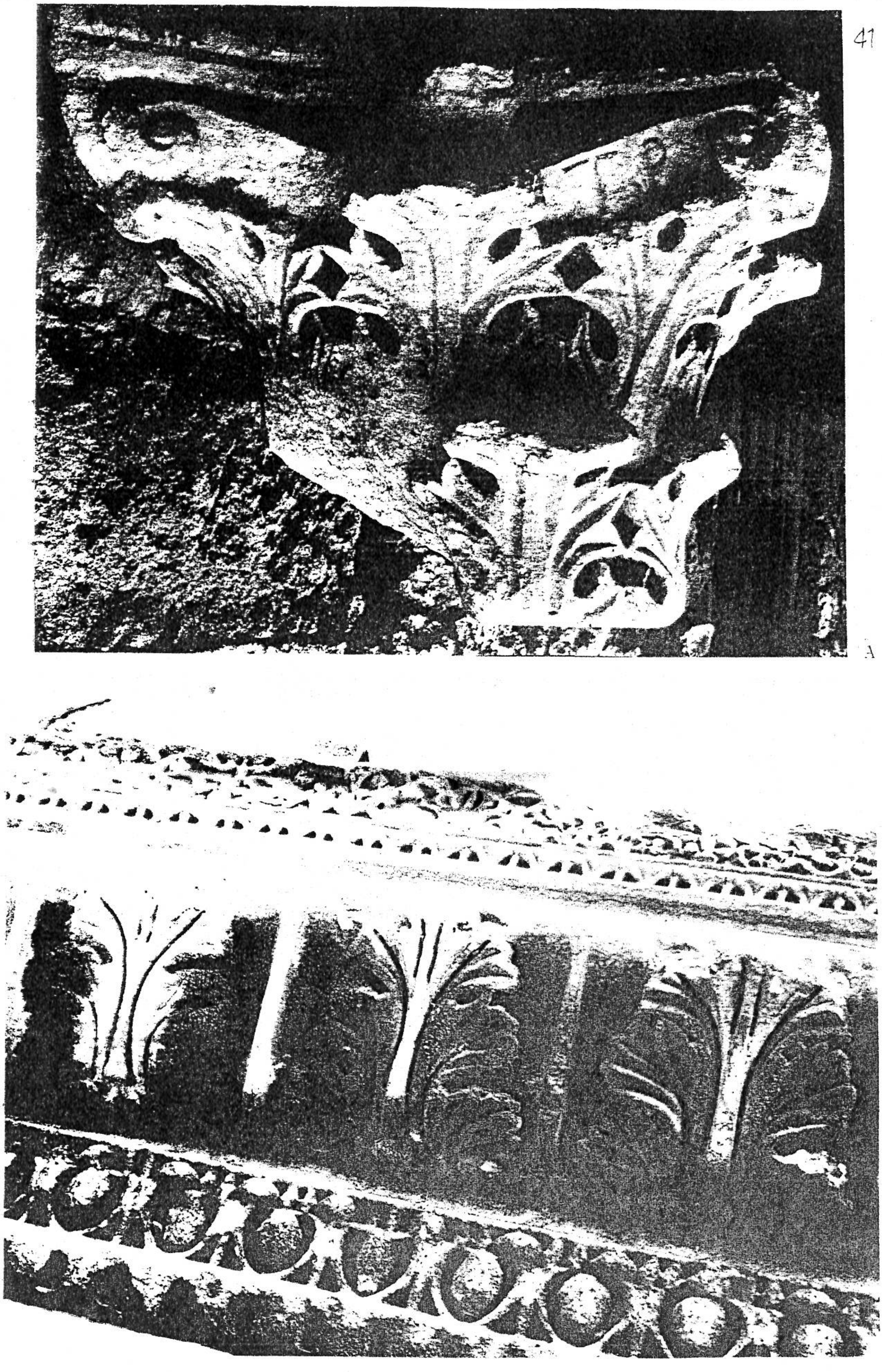
HOUSE OF JUSTINIAN

A. Negative of first sea-wall and capital re-used in its construction. B. Setting for door hinge. C. Cross on lintel. D. Jamb for doorway (see folder D, F G). E. Lintel from original sea-wall.



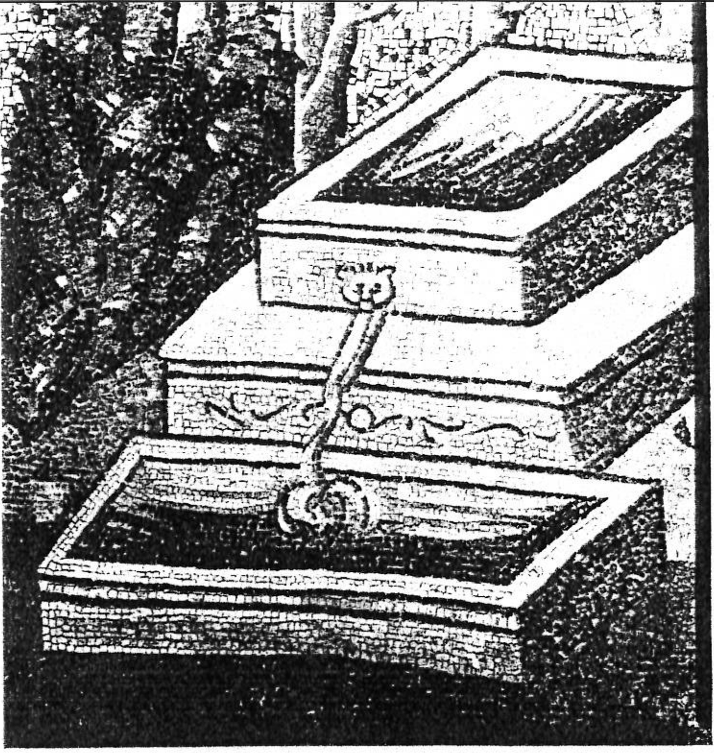
HOUSE OF JUSTINIAN

A. Marble string course in Pier A. B. Mortar bedding of loggia pavement.



HOUSE OF JUSTINIAN

A. Capital embedded in concrete of 2nd sea-wall. B. Sculptured hood of doorway F G.



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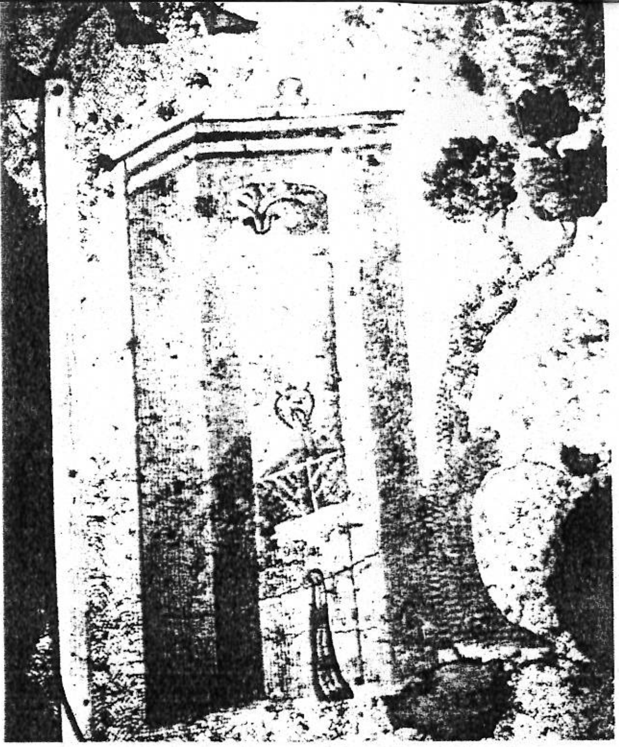

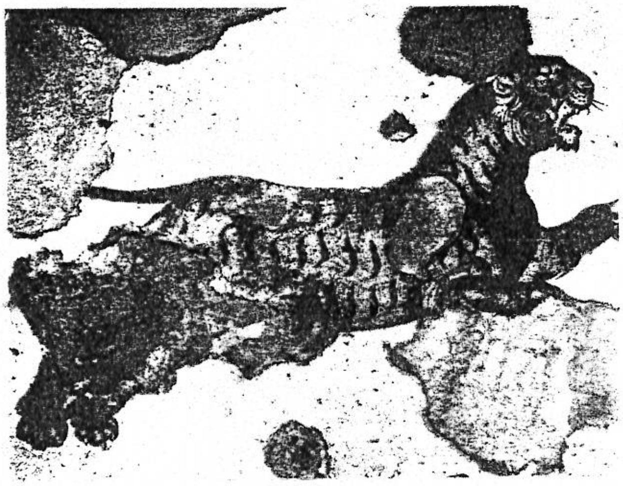

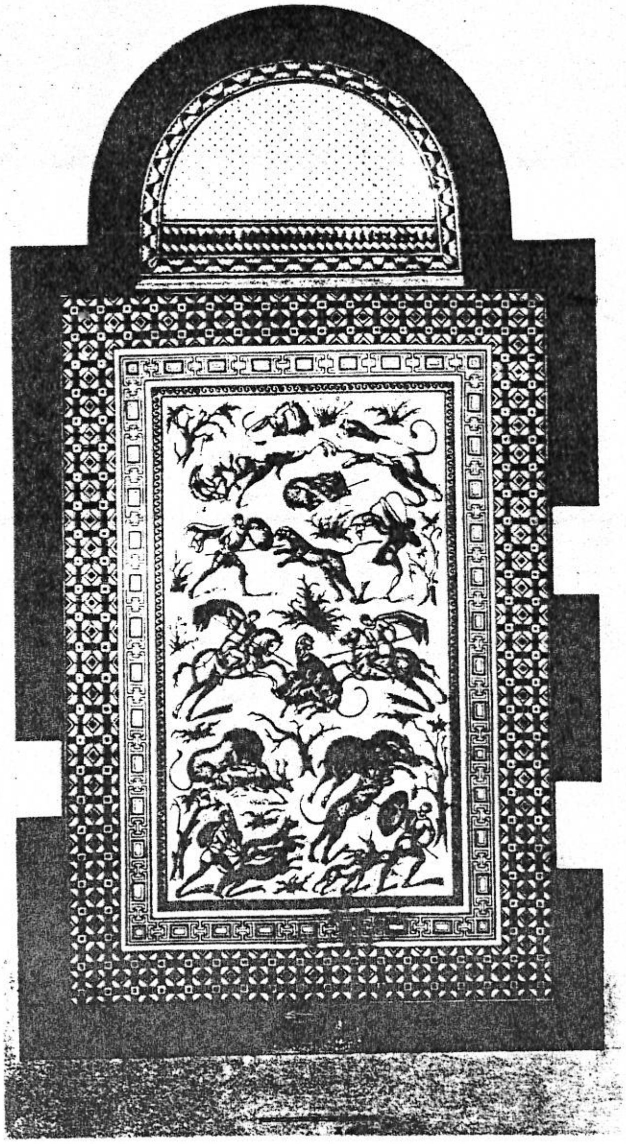

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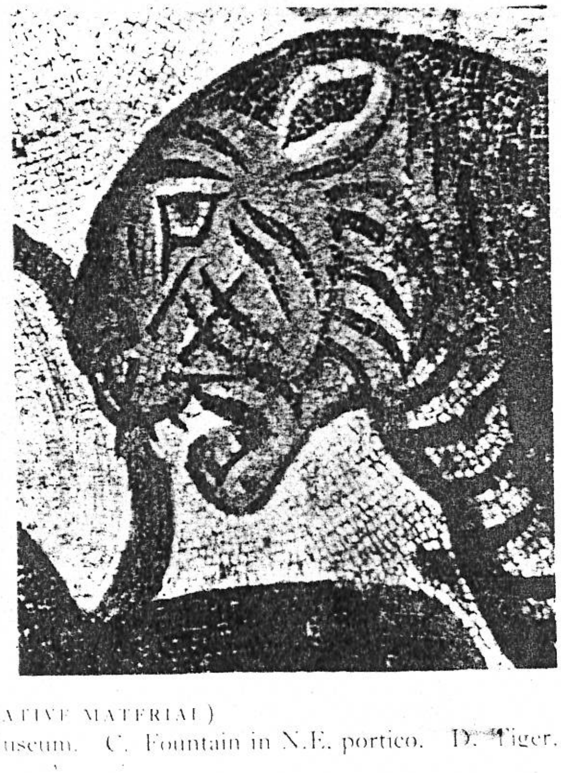
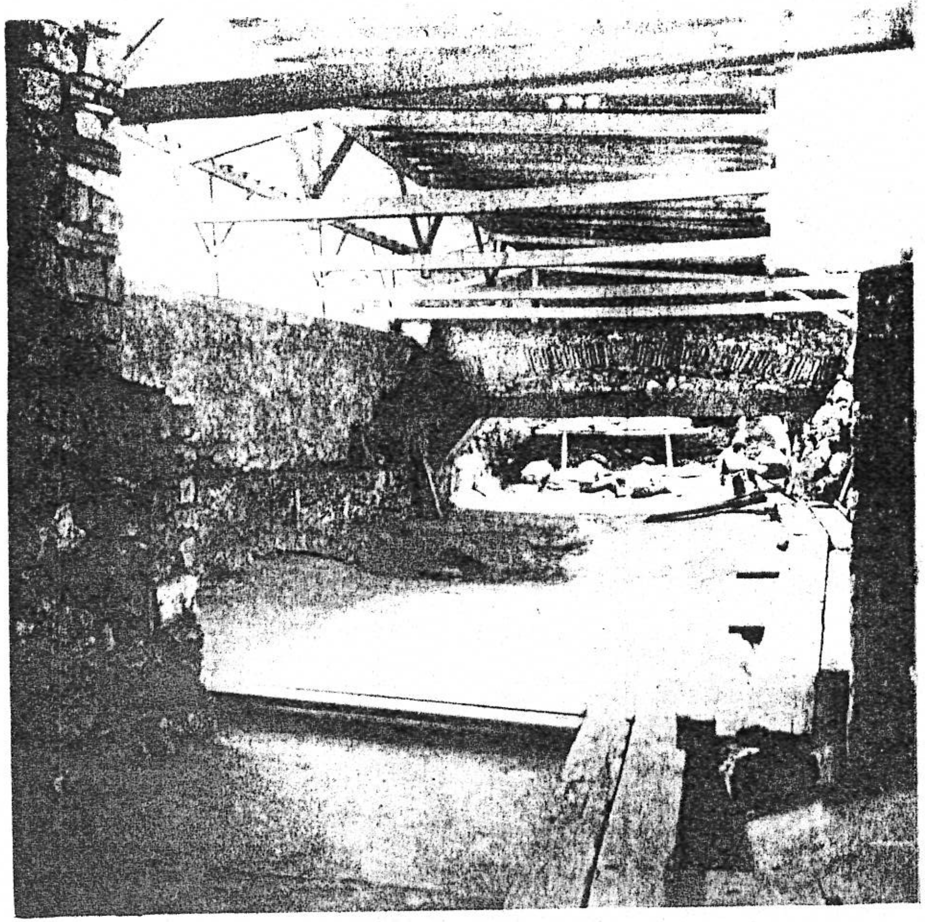


E

MOSAIC (COMPARATIVE MATERIAL)

A. Fountain, Kariye Camii. B. The Apamea floor, Brussels Museum. C. Fountain in N.E. portico. D. Tiger, N.E.



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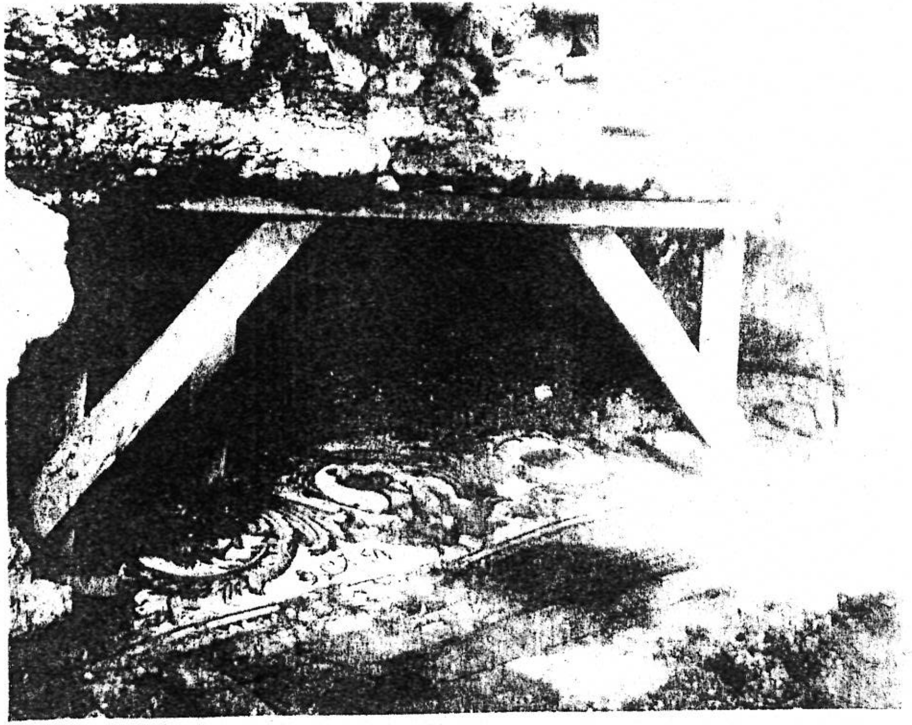

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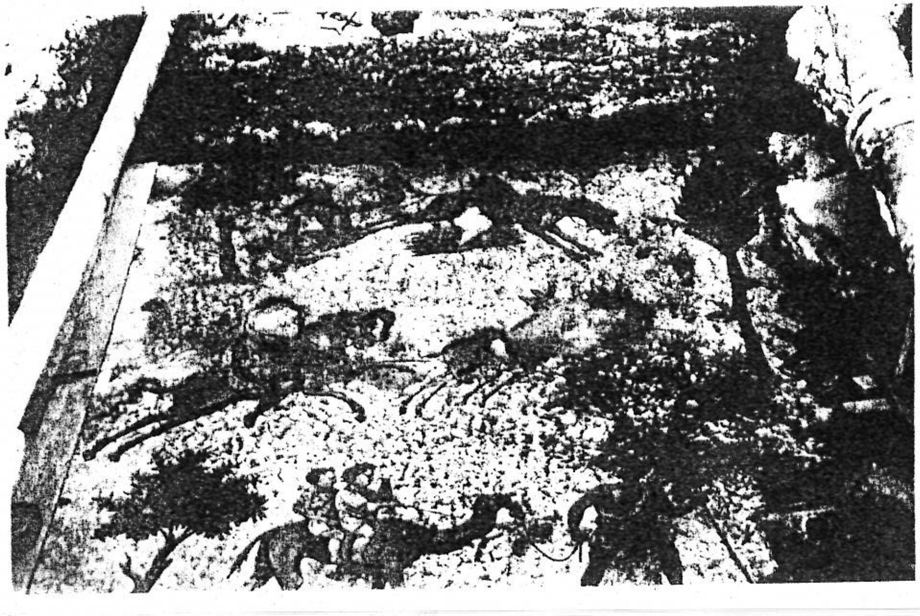


C

Plate 44 to Plate 50

Collotype Reproductions of the Mosaics.

PLATE 44. North East Portico. A. Fountain
B. Hunter

PLATE 45. North East Portico. Central Section

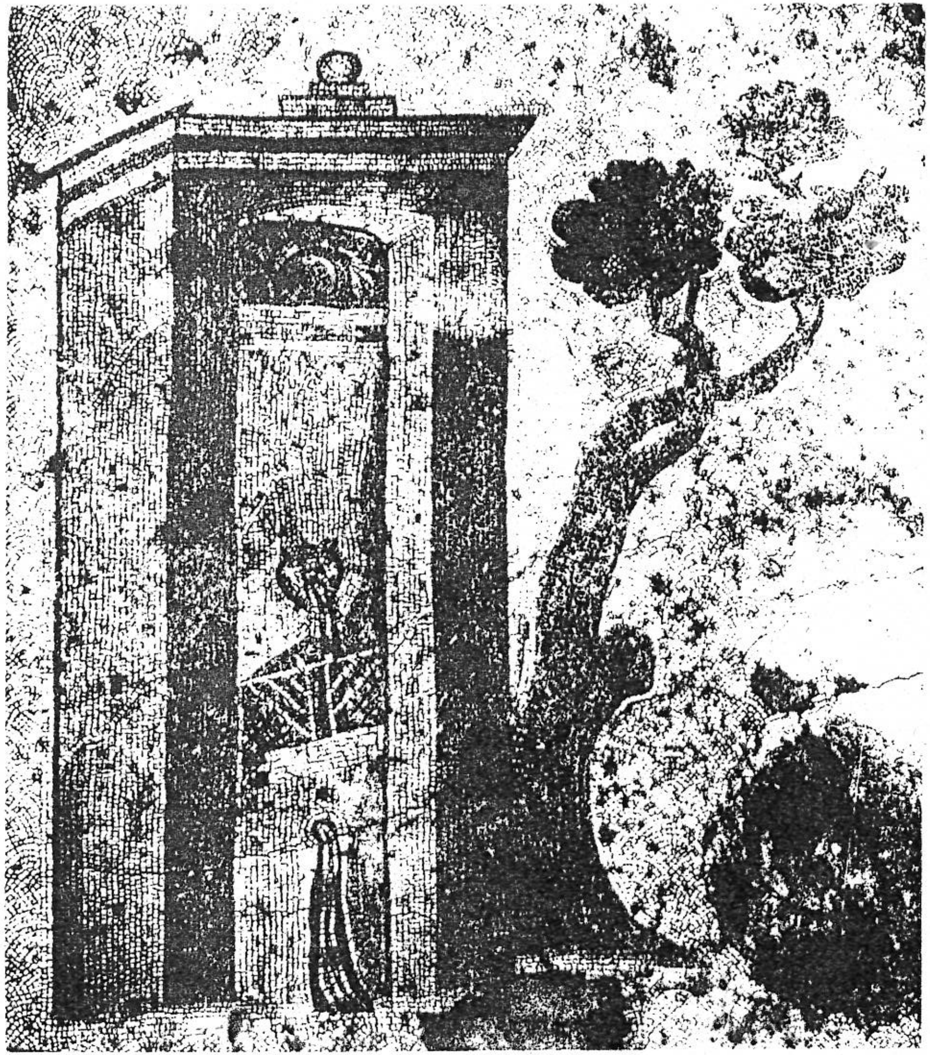
PLATE 46. North East Portico. A. Building, wall and river
B. Tree, bear and weasel

PLATE 47. North East Portico. Tree and Peasants hoeing

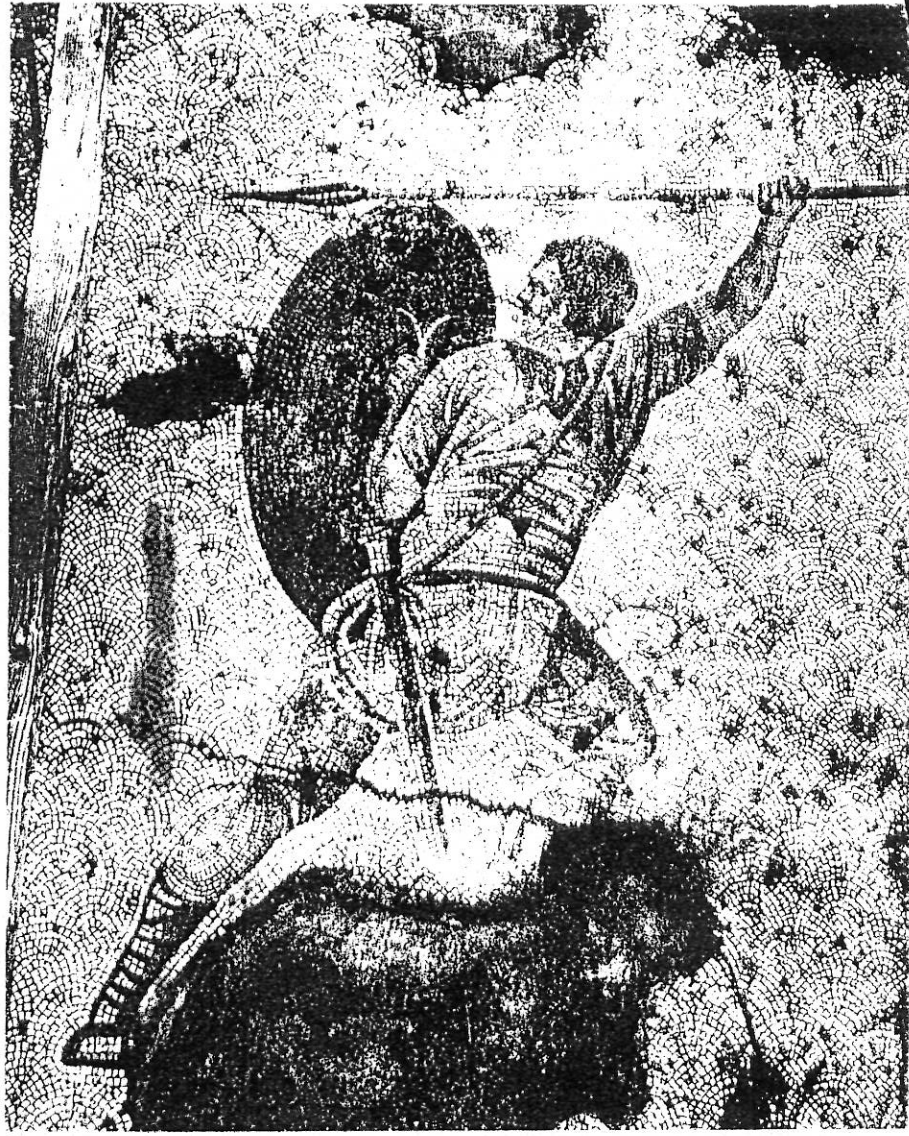
PLATE 48. A. Detail of border at A, A1.
B. Detail of border in North East Portico, at S.E. corner

PLATE 49. A. Border, Area A, A1.
B. Detail of border at S.E. corner
C. Detail of great head

PLATE 50. Great Head at A, A1



A



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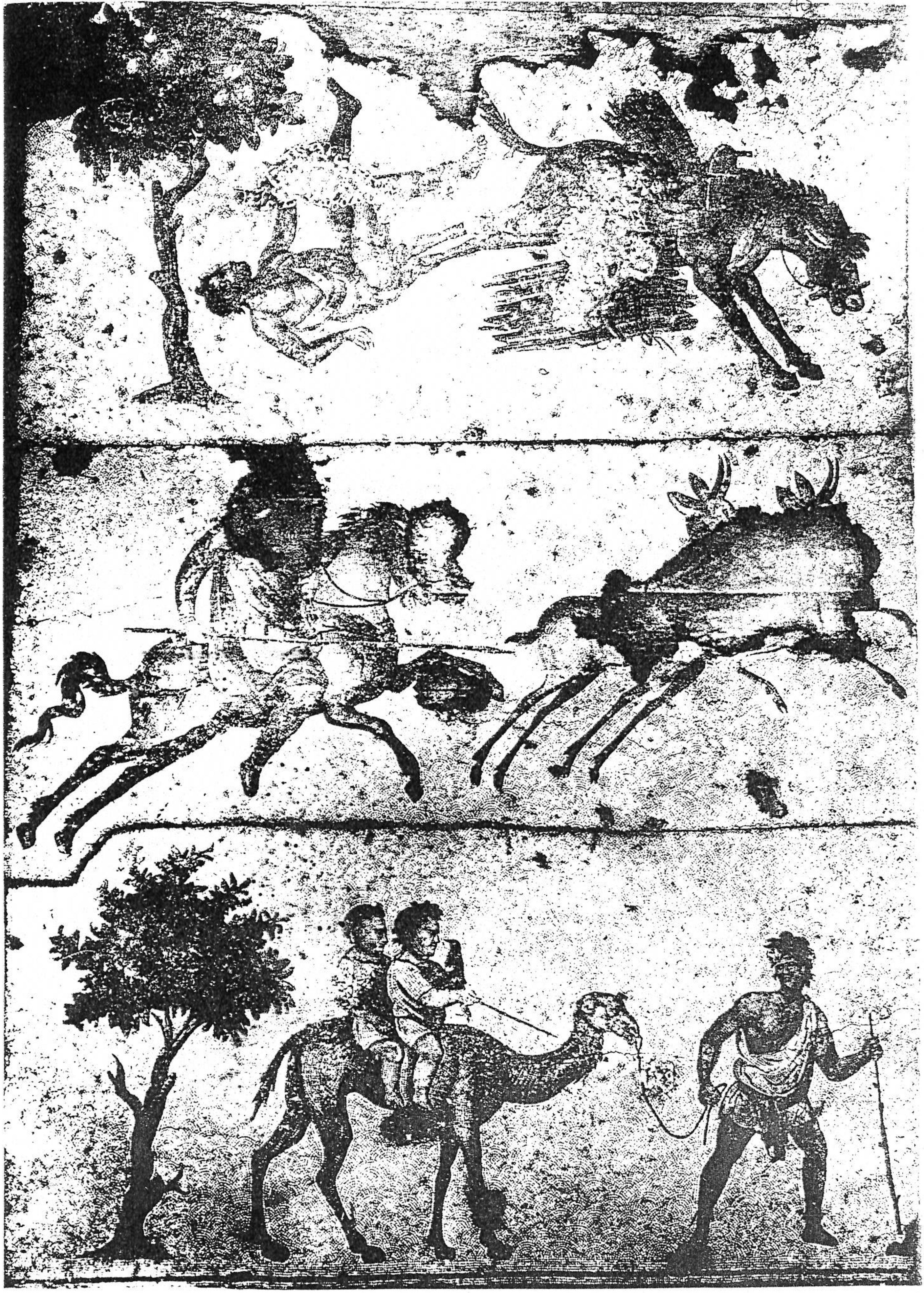

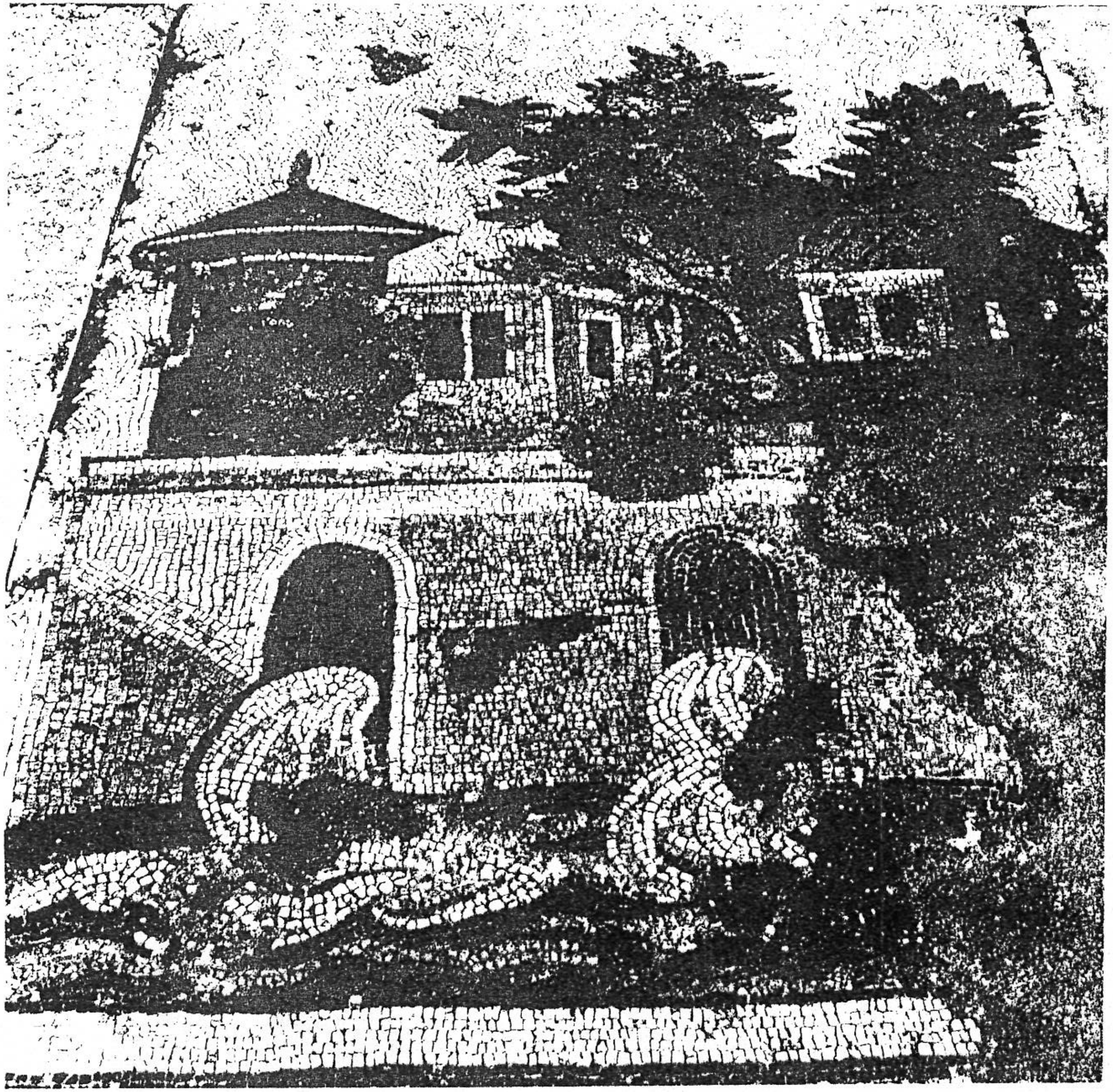

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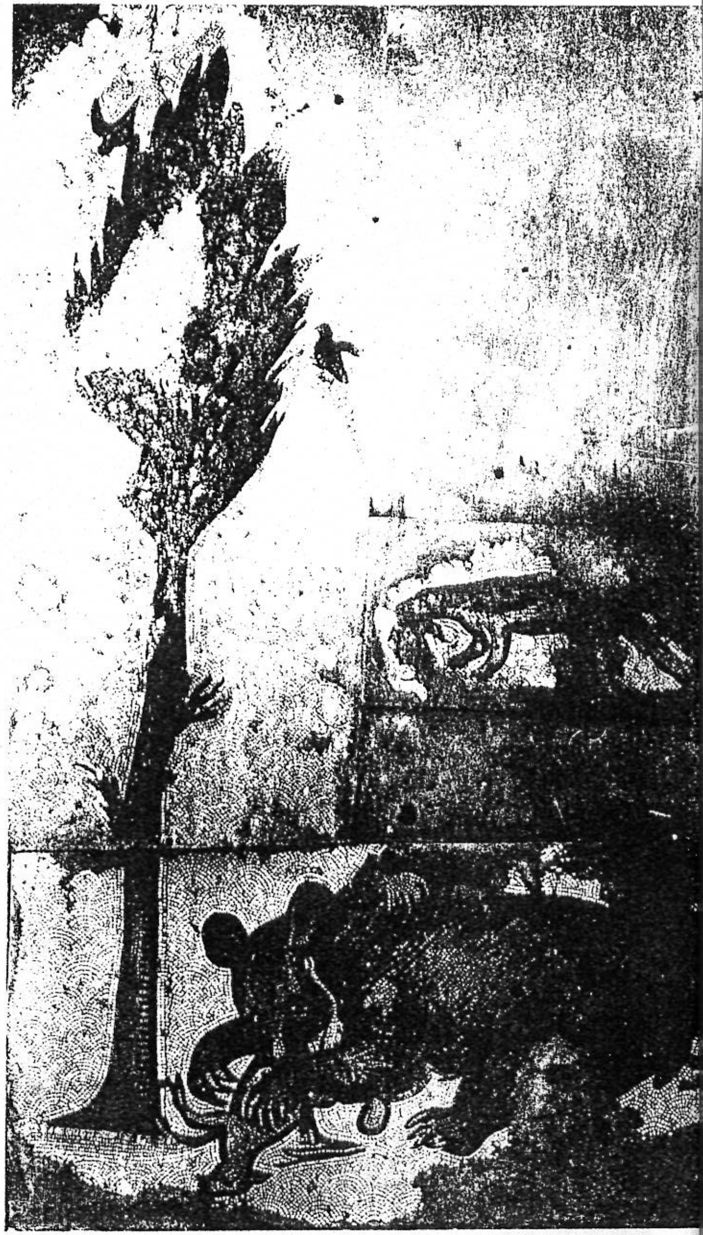

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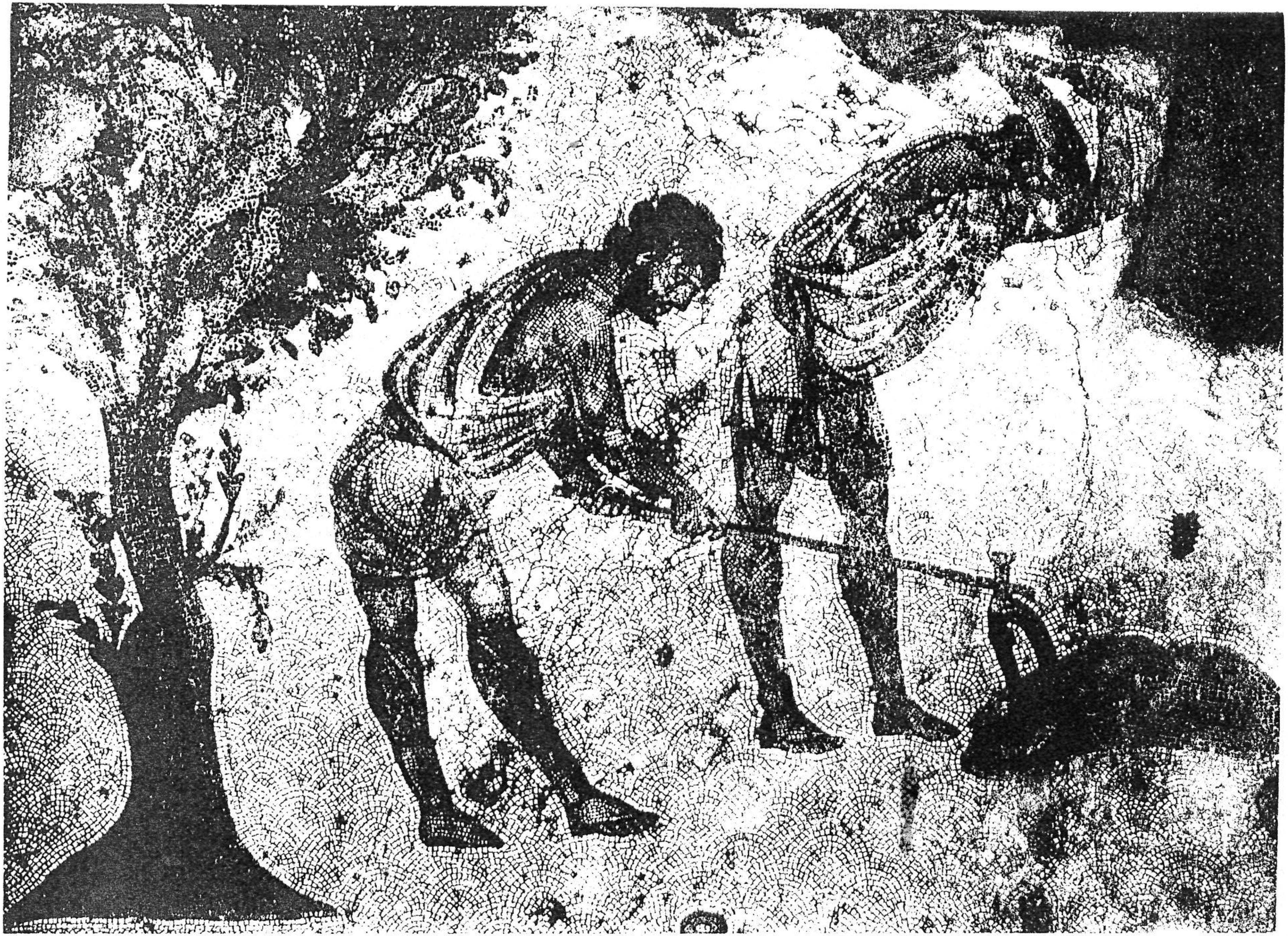

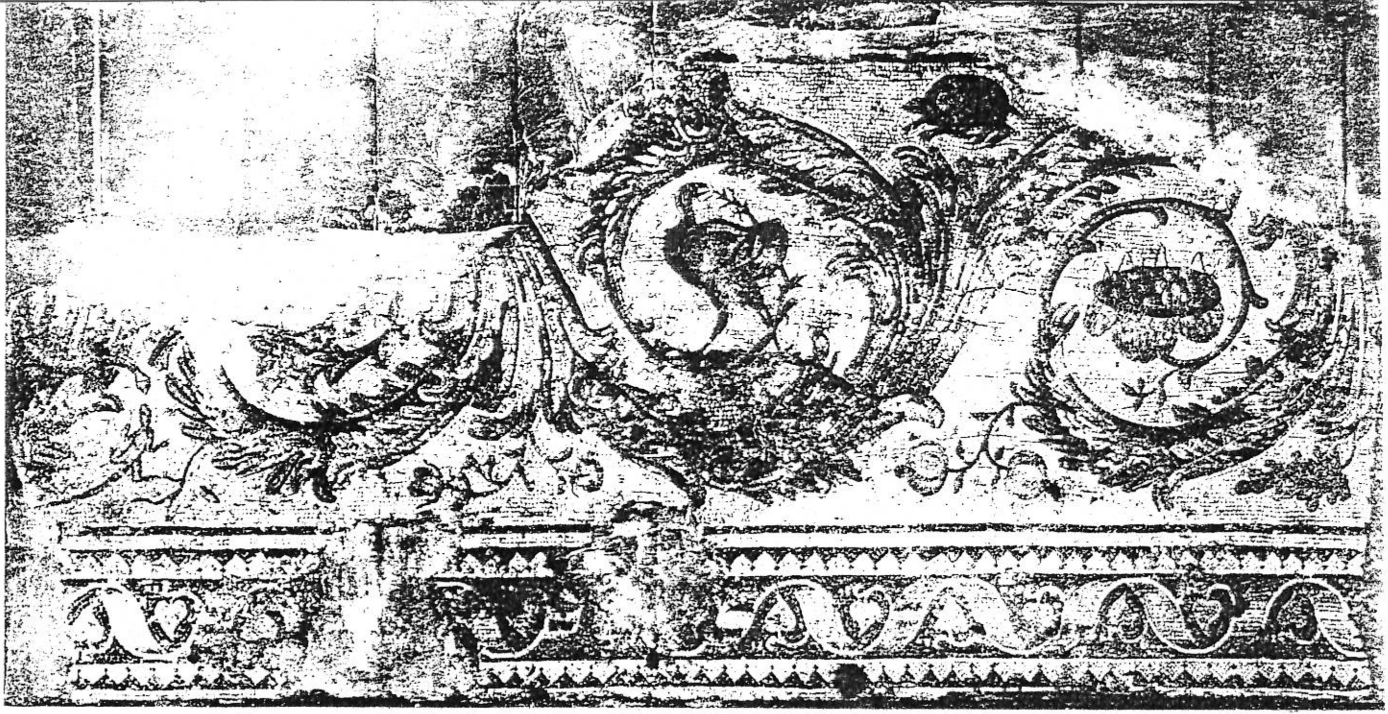

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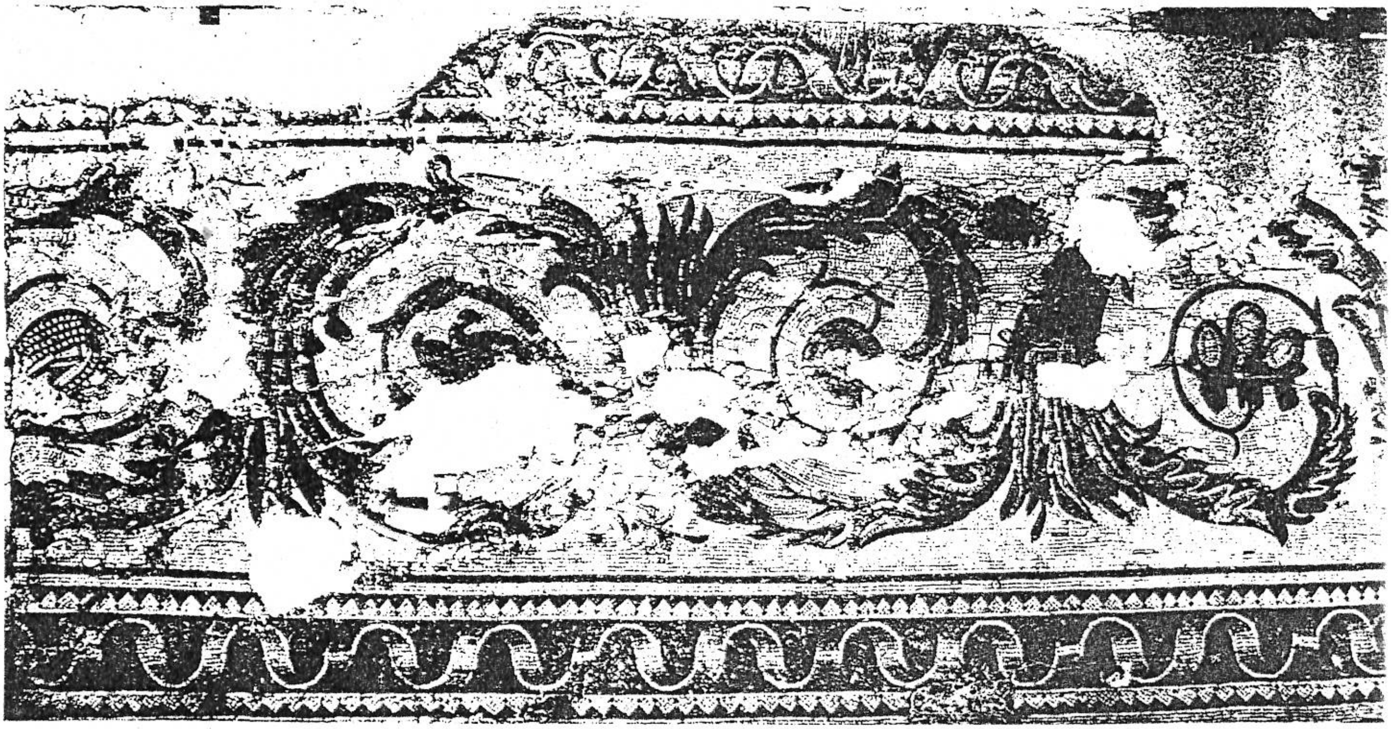

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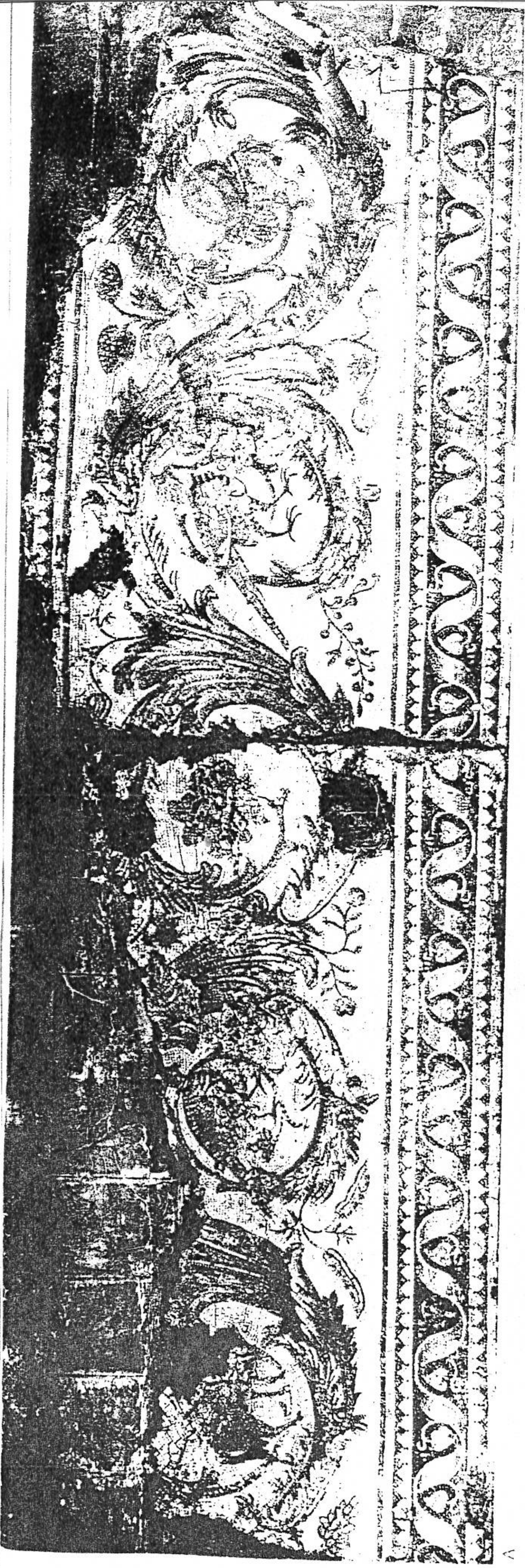
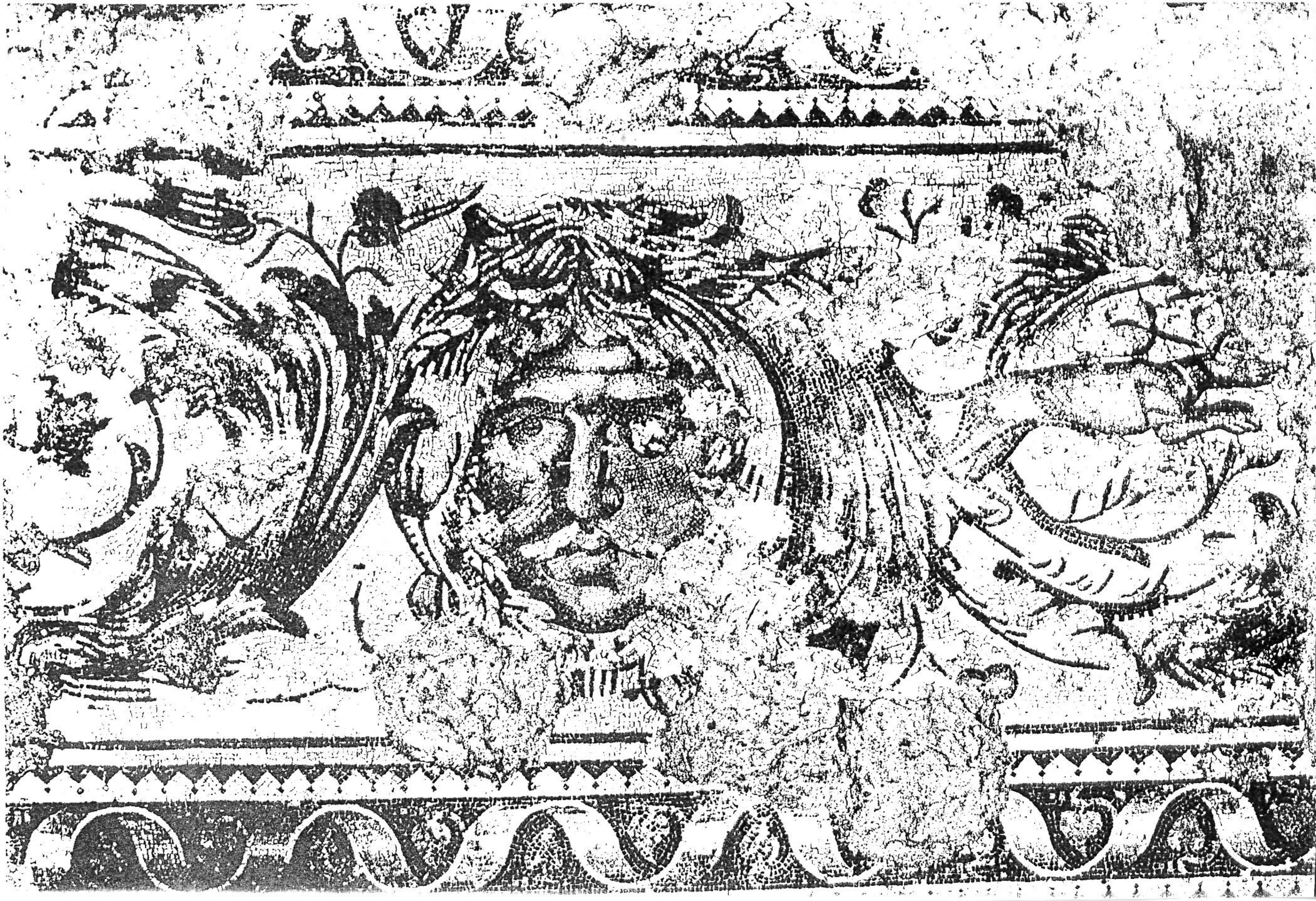




THE FAMILY OF KANTAKOUZENOS: *ca.* 1100—1350

TABLE I

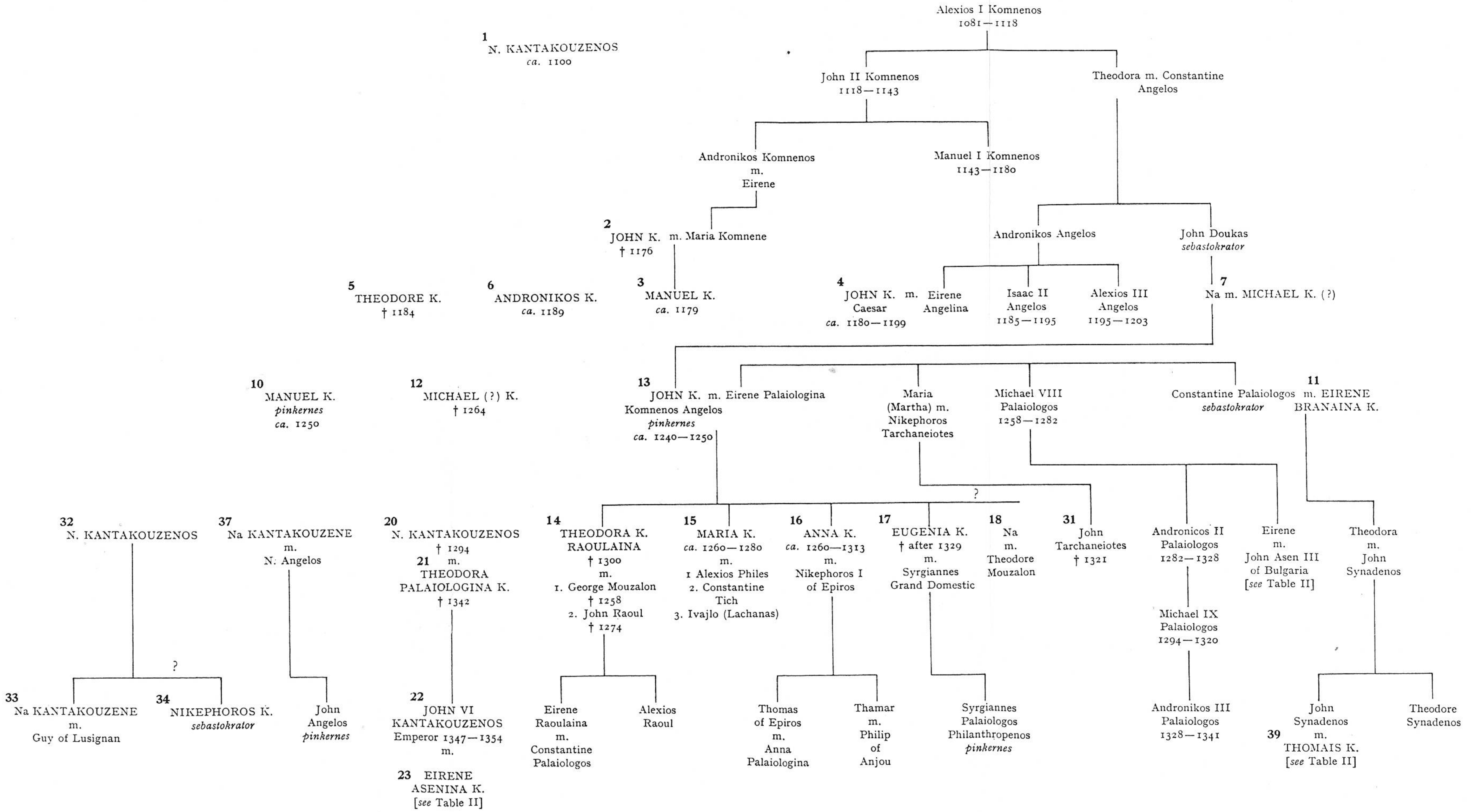
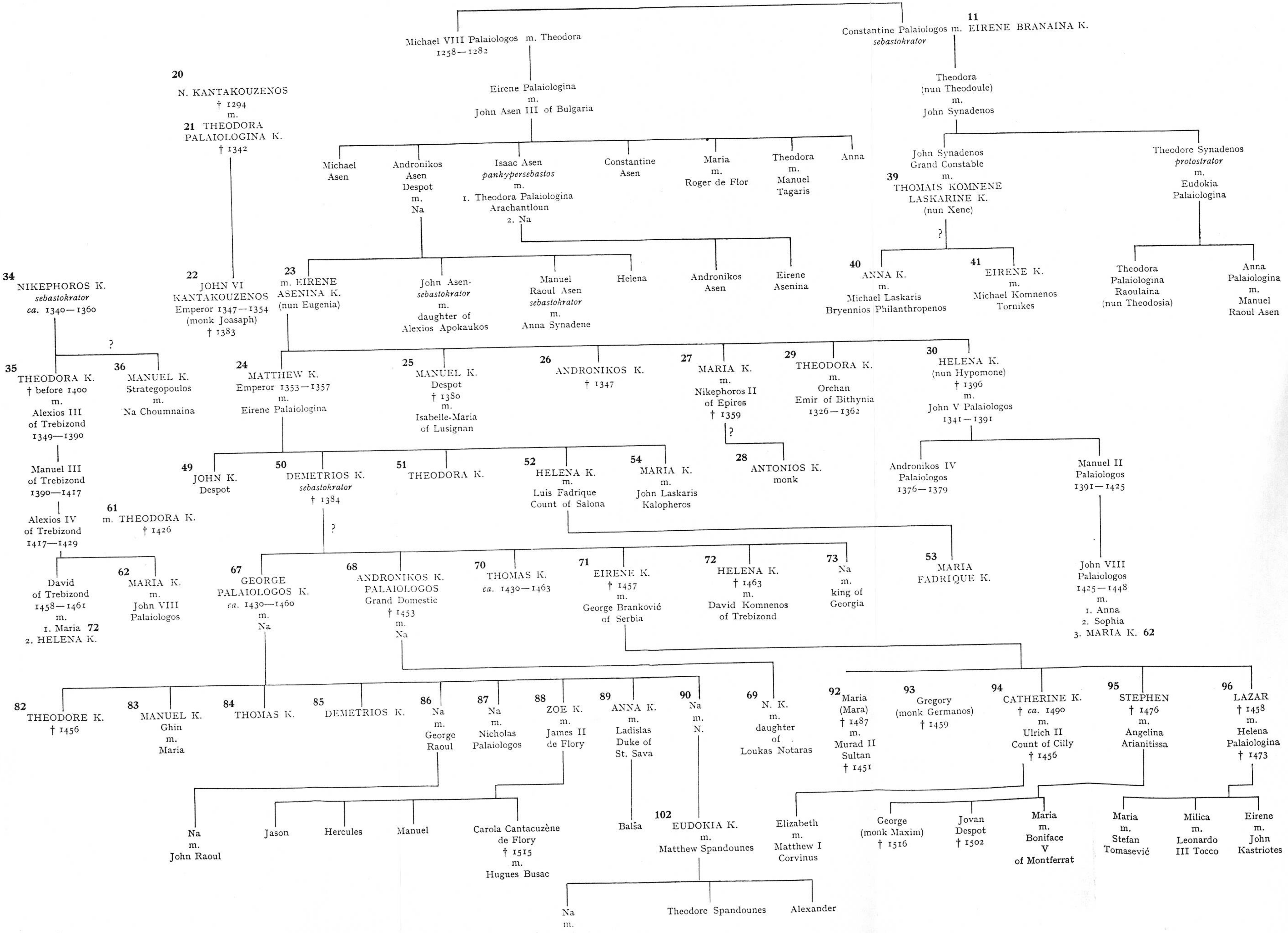

Alexios I Komnenos
1081—1118
1
N. KANTAKOUZENOS
ca. 1100
John II Komnenos
1118—1143
Theodora m. Constantine Angelos
Andronikos Komnenos m. Eirene
Manuel I Komnenos
1143—1180
2
JOHN K. m. Maria Komnene
† 1176
Andronikos Angelos
John Doukas
sebastokrator
5
THEODORE K.
† 1184
6
ANDRONIKOS K.
ca. 1189
3
MANUEL K.
ca. 1179
4
JOHN K. m. Eirene Angelina
Caesar
ca. 1180—1199
Isaac II Angelos
1185—1195
Alexios III Angelos
1195—1203
7
Na m. MICHAEL K. (?)
10
MANUEL K.
pinkernes
ca. 1250
12
MICHAEL (?) K.
† 1264
13
JOHN K. m. Eirene Palaiologina
Komnenos Angelos
pinkernes
ca. 1240—1250
Maria (Martha) m. Nikephoros Tarchaneiotes
Michael VIII Palaiologos
1258—1282
Constantine Palaiologos
sebastokrator
11
m. EIRENE BRANAINA K.
?
32
N. KANTAKOUZENOS
37
Na KANTAKOUZENE m. N. Angelos
20
N. KANTAKOUZENOS
† 1294
21 m.
THEODORA PALAIOLOGINA K.
† 1342
14
THEODORA K. RAOULAINA
† 1300
m.
1. George Mouzalon
† 1258
2. John Raoul
† 1274
15
MARIA K.
ca. 1260—1280
m.
1 Alexios Philes
2. Constantine Tich
3. Ivajlo (Lachanas)
16
ANNA K.
ca. 1260—1313
m.
Nikephoros I of Epiros
17
EUGENIA K.
† after 1329
m.
Syrgiannes
Grand Domestic
18
Na m. Theodore Mouzalon
31
John Tarchaneiotes
† 1321
Andronicos II Palaiologos
1282—1328
Eirene m. John Asen III of Bulgaria
[see Table II]
Theodora m. John Synadenos
Michael IX Palaiologos
1294—1320
?
33
Na KANTAKOUZENE m. Guy of Lusignan
34
NIKEPHOROS K.
sebastokrator
John Angelos
pinkernes
22
JOHN VI KANTAKOUZENOS
Emperor 1347—1354
m.
23 EIRENE ASENINA K.
[see Table II]
Eirene Raoulaina m. Constantine Palaiologos
Alexios Raoul
Thomas of Epiros m. Anna Palaiologina
Thamar m. Philip of Anjou
Syrgiannes Palaiologos Philanthropenos
pinkernes
Andronikos III Palaiologos
1328—1341
John Synadenos
39 m.
THOMAIS K.
[see Table II]
Theodore Synadenos

TABLE II

THE FAMILY OF KANTAKOUZENOS: *ca.* 1250—1460


Michael VIII Palaiologos 1258—1282 m. Theodora
11 Constantine Palaiologos *sebastokrator* m. EIRENE BRANAINA K.
20 N. KANTAKOUZENOS † 1294 m. 21 THEODORA PALAIOLOGINA K. † 1342
Eirene Palaiologina m. John Asen III of Bulgaria
Theodora (nun Theodoule) m. John Synadenos
Michael Asen
Andronikos Asen Despot m. Na
Isaac Asen *panhypersebastos* m. 1. Theodora Palaiologina Arachantloun 2. Na
Constantine Asen
Maria m. Roger de Flor
Theodora m. Manuel Tagaris
Anna
John Synadenos Grand Constable m. 39 THOMAIS KOMNENE LASKARINE K. (nun Xene)
Theodore Synadenos *protostrator* m. Eudokia Palaiologina
?
34 NIKEPHOROS K. *sebastokrator* *ca.* 1340—1360
22 JOHN VI KANTAKOUZENOS Emperor 1347—1354 (monk Joasaph) † 1383
23 m. EIRENE ASENINA K. (nun Eugenia)
John Asen *sebastokrator* m. daughter of Alexios Apokaukos
Manuel Raoul Asen *sebastokrator* m. Anna Synadene
Helena
Andronikos Asen
Eirene Asenina
40 ANNA K. m. Michael Laskaris Bryennios Philanthropenos
41 EIRENE K. m. Michael Komnenos Tornikes
Theodora Palaiologina Raoulaina (nun Theodosia)
Anna Palaiologina m. Manuel Raoul Asen
?
35 THEODORA K. † before 1400 m. Alexios III of Trebizond 1349—1390
36 MANUEL K. Strategopoulos m. Na Choumnaina
24 MATTHEW K. Emperor 1353—1357 m. Eirene Palaiologina
25 MANUEL K. Despot † 1380 m. Isabelle-Maria of Lusignan
26 ANDRONIKOS K. † 1347
27 MARIA K. m. Nikephoros II of Epiros † 1359
29 THEODORA K. m. Orchan Emir of Bithynia 1326—1362
30 HELENA K. (nun Hypomone) † 1396 m. John V Palaiologos 1341—1391
Manuel III of Trebizond 1390—1417
?
28 ANTONIOS K. monk
Andronikos IV Palaiologos 1376—1379
Manuel II Palaiologos 1391—1425
49 JOHN K. Despot
50 DEMETRIOS K. *sebastokrator* † 1384
51 THEODORA K.
52 HELENA K. m. Luis Fadrique Count of Salona
54 MARIA K. m. John Laskaris Kalopheros
Alexios IV of Trebizond 1417—1429
61 m. THEODORA K. † 1426
?
David of Trebizond 1458—1461 m. 1. Maria 72 2. HELENA K.
62 MARIA K. m. John VIII Palaiologos
67 GEORGE PALAIOLOGOS K. *ca.* 1430—1460 m. Na
68 ANDRONIKOS K. PALAIOLOGOS Grand Domestic † 1453 m. Na
70 THOMAS K. *ca.* 1430—1463
71 EIRENE K. † 1457 m. George Branković of Serbia
72 HELENA K. † 1463 m. David Komnenos of Trebizond
73 Na m. king of Georgia
53 MARIA FADRIQUE K.
John VIII Palaiologos 1425—1448 m. 1. Anna 2. Sophia 3. MARIA K. 62
82 THEODORE K. † 1456
83 MANUEL K. Ghin m. Maria
84 THOMAS K.
85 DEMETRIOS K.
86 Na m. George Raoul
87 Na m. Nicholas Palaiologos
88 ZOE K. m. James II de Flory
89 ANNA K. m. Ladislas Duke of St. Sava
90 Na m. N.
69 N. K. m. daughter of Loukas Notaras
92 Maria (Mara) † 1487 m. Murad II Sultan † 1451
93 Gregory (monk Germanos) † 1459
94 CATHERINE K. † *ca.* 1490 m. Ulrich II Count of Cilly † 1456
95 STEPHEN † 1476 m. Angelina Arianitissa
96 LAZAR † 1458 m. Helena Palaiologina † 1473
Na m. John Raoul
Jason
Hercules
Manuel
Carola Cantacuzène de Flory † 1515 m. Hugues Busac
Balša
102 EUDOKIA K. m. Matthew Spandounes
Elizabeth m. Matthew I Corvinus
George (monk Maxim) † 1516
Jovan Despot † 1502
Maria m. Boniface V of Montferrat
Maria m. Stefan Tomasević
Milica m. Leonardo III Tocco
Eirene m. John Kastriotes
Na m.
Theodore Spandounes
Alexander